

CURRICULUM VITAE (22/04/2023)

NAME : José Cernicharo

PLACE AND DATE OF BIRTH : Albacete. Spain. 3-3-1956.

NATIONALITY : Spanish and French

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Instituto de Física Fundamental (IFF-CSIC)

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EDUCATION :

Ph.D. in Astronomy, 1988. University of Paris VII. **Thèse de Doctorat d'État ès Sciences.**

Thesis Title : "Matiere Diffuse et Molecules Interestellaires"

Thesis Adviser : Michel Guélin.

Degree in Physics June 1978 (University Complutense Madrid; Spain).

POSITIONS :

1979-1983 Research Fellowship by french MRT.

1983-1988 Chargé de Recherche CNRS (France).

1988-1992 Research Astronomer, INSTITUTE Astronómico de Yebes
Instituto Geográfico Nacional (Spain).

1988-1991 Co-Director of the IRAM Observatory at Sierra Nevada
(Spain).

1992 Responsible of the IGN Department of Astronomical Applications.

1996-..... Research Professor at the Consejo Superior de Investigaciones Científicas (CSIC)

2010-2011 Vicedirector of Science of the Center of Astrobiology

CURRENT RESEARCH INTERESTS:

Laboratory Astrophysics (activities associated to the Consolider project ASTROMOL and the ERC Synergy project Nanocosmos)

Molecular spectroscopy at millimeter and submillimeter wavelenghts

Quantum physics applied to small molecular systems

New observational methods in molecular spectroscopy using radioastronomical receivers

Photo-chemistry

Chemical reactivity at low temperature in supersonic flows

Chemical reactivity at ambient temperature using rotational spectroscopy as tracer of reactants and products.

Molecular Physics

Molecular Hamiltonians for small molecules. MADEX code (6433 high-accuracy
spectral entries)

Isomeric photo-switching in space

Photodissociation in space and in the laboratory

Search for new molecules in Space

Cold Plasma physics and chemistry

Interstellar Medium :

Physical conditions of molecular clouds.

Radiative Transfer.
Chemistry.
Spectroscopy (microwave and infrared).
Molecular emission and radiative transfer in molecular clouds.
Search for new molecules (molecular physics)
Masers.

Late Type Stars :

Circumstellar envelopes.
Chemistry.
Spectroscopy (microwave and infrared).
Physical conditions.
Search for new molecules (molecular physics)
Masers.

Galaxies :

Physical conditions in the interstellar medium of galaxies.
Structure.
Kinematics.

Infrared Astrophysics (Space Research):

ISO studies of Molecular Clouds and Late Type Stars.
Far, mid and near-Infrared Spectroscopy.
HERSCHEL (mission scientist)

Astronomical Instrumentation:

Radio Telescopes (Pointing, Calibration, Efficiencies).
Control and data acquisition software for radio telescopes.
Real time control of radio telescopes.
Propagation of Electromagnetic Waves in the Earth atmosphere.
Thermal effects on the pointing of radio telescopes.
Interferometry.
Infrared instruments for space platforms
Well knowlegde of the technical aspects of Heterodyne SIS Receivers and Radio
Astronomical Backends (correlators, filter banks, AOS, ...)
Use of radioastronomical receivers for laboratory astrophysics

TECHNICAL ACTIVITIES:

- * Pointing of the 13.7 m radio telescope of the Observatorio Astronomico Nacional (Yebes, 1979)
- * Real time control and data acquisition software for the POM-I radiotelescope (Bordeaux observatory; (1979-1981).
 - * Member of the commissioning team of the IRAM 30-m radio telescope (1984-1985).
 - * Member of the commissioning team of the IRAM interferometer (1986-1989).
 - * Pointing and calibration of the POMII radiotelescope (Grenoble Observatory; 1987).
 - * Co-Director of the 30-m IRAM radio telescope (1988-1991).
- * Responsible of the update of the 1.5 m telescope of the OAN (Calar-Alto) between November 1994 and May 1996
- * Member of the Science IPT of ALMA (Calibration and Telescopes) (1998-2010)
- * Member of different evaluation boards for the Herschel instruments (1998-2011)
- * Development of the “GAs CELL for Laboratory Astrophysics – GACELA” experimental set-up of Nanocosmos (2014-2018)

- * Commissioning of the HEMT receivers of Nanocosmos for the the 40m radio telescope of the Centro Astronómico de Yebes. (2019-2021)

OTHER ACTIVITIES :

- * Referee of Astronomy and Astrophysics, the Astrophysical Journal and others Astrophysical journals.
- * Referee of Nature, Science, PNAS, J. Chem. Phys., and other Physics and chemistry journals.
- * Member of the IRAM program committee 1992.
- * Chairman of the IRAM program committee 1993.
- * Member of the Commission "Physics and Mathematics" of the Spanish Evaluation Agency in 1990, 1991 and 1992.
- * **Member of the OTAC panel “Interstellar Medium” of the ISO satellite**
- * **Mission Scientist of HERSCHELL.**
- * Member of the Scientific Advisory Committee of the 10.4 meters telescope of the Canary Islands Institute of Astrophysics
- * Spanish delegate in the European ALMA COORDINATION COMMITTEE 2001-2002
- * Spanish delegate in the European ALMA BOARD, 2003-2005
- * Spanish Observer in the ALMA BOARD, 2003-2004
- * Member of the Astronomical Working Group of ESA
- * Member of the European Scientific Advisory Committee of ALMA
- * Member of the Panel 9 of the Starting Grants of the ERC 2008-2009
- * Member of the Panel 9 of the Advanced Grants of the ERC 2016, 2018, 2020
- * Member of the Czech Evaluation panel of Physics and Astrophysics (EX1), 2021-....

AWARDS

- Prize Betancourt-Perronet (1997) to the Spanish-French Scientific Collaboration. French Ministry of National Education.
- Prize Scientific Excellence “Gabriel Alonso Herrera” 2007 of the “Junta de Comunidades de Castilla La Mancha”
- Corresponding PI of the ERC Synergy project Nanocosmos (<https://nanocosmos.iff.csic.es/>)
- Chair of excellence Guillermo Haro, INAOE, 2016, Mexico
- Medal of the Spanish Royal Society of Physics 2018 (prize RSEF/BBVA)
- Prize to the scientific career “Miguel A. Catalán” 2020. Madrid Gouvernment
- National Research Prize 2022 “Blas Cabrera”. Spanish Ministry of Science and Innovation.

SCIENTIFIC PUBLICATIONS AND MAIN RESULTS (see ANNEX I, II and III):

November 2022:: 566 publications in the ApJ, ApJ Letters, A&A, Nature, Science, and other main journals of physics and chemistry. 25575 citations with an H index of 80 (ADS NASA database). Total number of reads of my scientific contributions (refereed and conferences) is 315764 (ADS). For the refereed publications the number of reads is 290893 (ADS).

INVITED CONFERENCES AND LECTURES: 307 invited talks, lectures, and other contributions. Scientific Director of several international schools of Astrochemistry in Spain, Argentine, Mexico, Chili (see section 3). Two of them COSPAR Capacity Building Workshops (Buenos Aires 2012, and Quito 2018)

Member of the SOC of a large number of international conferences. Chairman of the SOC of several conferences devoted to Herschel, ALMA, and Laboratory Astrophysics (see Section 3).

**DETAILED DESCRIPTION OF THE SCIENTIFIC AND
TECHNICAL ACTIVITIES
OF J. Cernicharo**

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1) IMPACT OF MY SCIENTIFIC ACTIVITY

Following the ADS database, which is specialized in Astrophysics and Physics, I have published by 22 April 2023 **577** papers published in main journals (Q1: see Annex I), and **314** in proceedings of conferences and other publications. I have **26597** citations (**11827** papers quoting my publications). My **H** index following ADS and WoS is **81**. Since January 2012 the averaged number of citations per year of my refereed publications is **≈1600**.

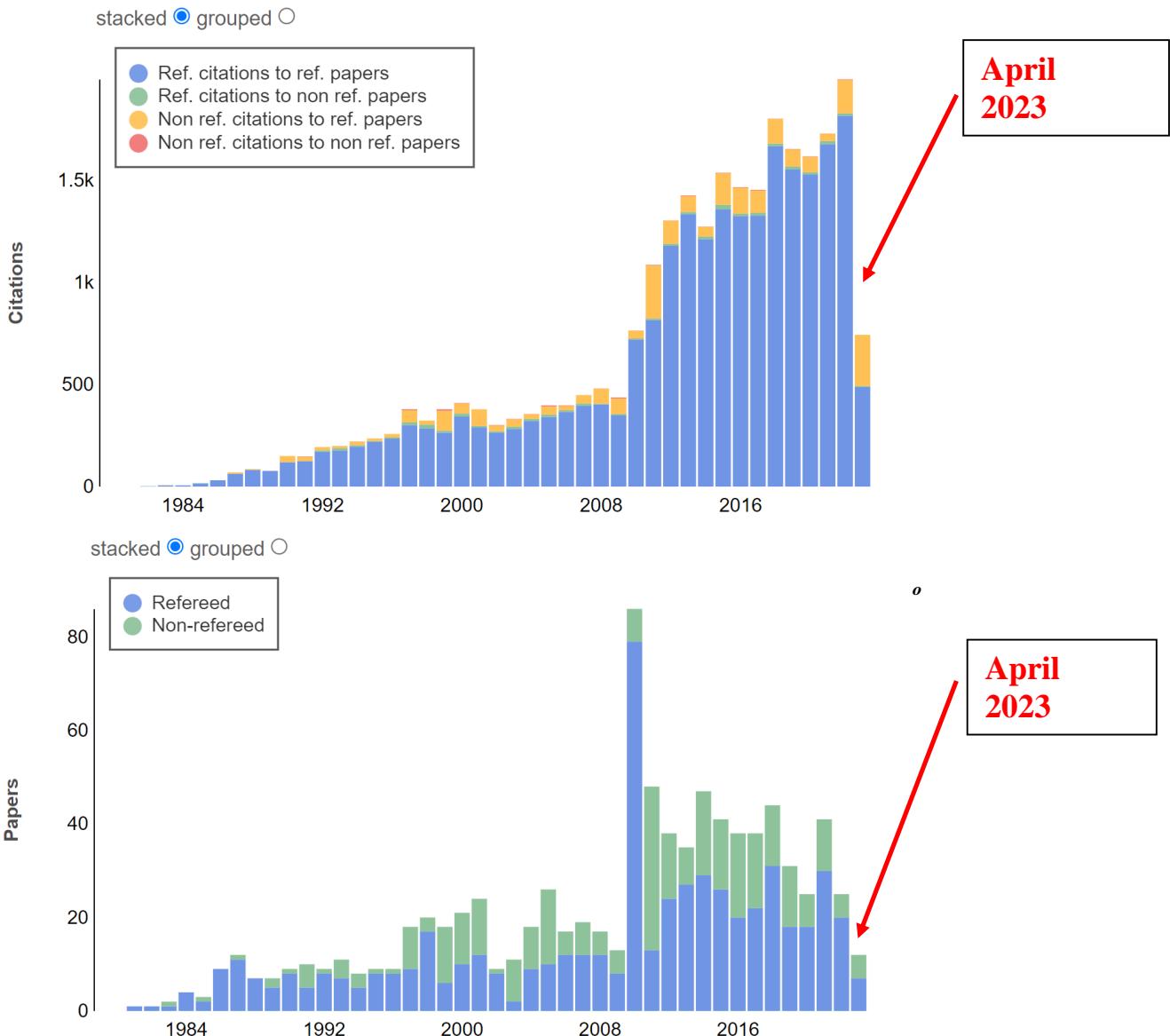


Figure 1: The top panel shows the number of cites per year since the beginning of my carrier. Bottom panel shows the number of papers published per year. **The peak in publications of 2010 corresponds to the publication of the first results of the Herschel satellite of which I was Mission Scientist since 1998 until the end of the mission (2016).**

2) MAIN SCIENTIFIC RESULTS

The interpretation of astronomical data, and in particular of those related with observations of molecular species, requires a strong collaboration between scientists from different disciplines. To reveal the microscopic aspects of astrophysical observations specific parameters of the observed molecules as required: molecular structure, frequencies and transition intensities, collision rate constants with species more abundant (hydrogen, electrons, etc.). All

this information is absolutely necessary to interpret data collected by ground-based telescopes and space platforms. Furthermore, once the abundances of some molecules have been determined, their reactivity with all other existing molecular species in molecular clouds is a basic ingredient for chemical modeling of the observed source, and for our understanding of chemical complexity in space. Therefore, Molecular Astrophysics is a novel multidisciplinary field of research in which synergy between astronomers, physicists and chemists is essential to understand the molecular evolution of our galaxy and distant objects. Without the data provided by theoretical and experimental groups, the interpretation of the results from expensive instruments such as the Herschel satellite or the interferometer ALMA, would be very limited.

As a result of the described synergetic strategy I would like to point the following results achieved along my career:

1) I am one of world leaders in the search for new molecular species in space and in their characterization in the laboratory. I have participated in the discovery of more than 45% of the molecules detected so far in space (November 2022; 101 molecules). **Many of these molecules have been detected without any knowledge a priori of their structure of their rotational frequencies. The spectral observation of interstellar and circumstellar sources has been used as a spectroscopic laboratory.** The identification of many of these species has constituted an incredible challenge. These discoveries represent a key contribution to the chemistry in interstellar space. I have produced new chemical models, including new chemical networks to understand the chemical evolution of cold molecular clouds and the circumstellar envelopes of evolved stars.

The molecules I have detected are: C₅H, C₆H, C₇H, C₈H, NaCl, NaF, AlCl, KCl, MgNC, MgCN, MgC₂, SiC, SiNC, SiCN, AlNC, KCN, HMgNC, HCCO, CH₃NC, CH₃O, H₂C₃, H₂C₄, H₂C₅, HCS, HSC, NCO, CNCN, NCCNH⁺, H₂NC, H₂NCO⁺, HCNO, CH₂CHCH₃, HCCN, HC₄N, CP, HCP, PH₃, CH⁺ (rotational transitions), CN⁻, C₄H⁻, C₃N⁻, C₅N⁻, C₇N⁻, HC₄H, HC₆H, *c*-C₆H₆, CH₃COOCH₃, CH₃CH₂SH, *c*-C₆H₅OH, C₄, C₆, H₂O⁺, OH⁺, ArH⁺, NH₃D⁺, NO⁺, NS⁺, HCCS⁺, H₂Cl⁺, CH₃CH₂OCH₃, SiCSI, MgCCH, SiH₃CN, CH₃SiH₃, CH₃NCO, CaNC, MgC₃N, MgC₅N, MgC₄H, MgC₆H, HMgCCCN, NaCCCN, MgC₃N⁺, MgC₅N⁺, MgC₄H⁺, MgC₆H⁺, HC₄NC, HCCNCH⁺, NCCCCNH⁺, HC₅NH⁺, HC₇NH⁺, HC₃O⁺, HC₃S⁺, CH₃CO⁺, HCCS, HCCCCS, NCS, H₂CCS, H₂CCCS, C₄S, C₅S, HCSCN, HCSCCH, CH₂CHCCH, C₃H₃, H₂CCCHCCH, HCCCHCCC, CH₂CCHC₄H, *c*-C₅H, *c*-C₃HCCH, *c*-C₅H₆ (cyclopentadiene), *c*-C₉H₈ (indene, the first PAH found in space), benzyne (*c*-C₆H₄), two ethynyl isomers of cyclopentadiene (*c*-C₅H₅CCH), *c*-C₆H₅CCH, five isomers of cyano-propene, CH₃CHCO, and recently fulvenallene (*c*-C₅H₄CCH₂). The detection of these species have required hundreds of hours of observing time with the best radio and infrared telescopes. This observing time has been granted through extremely competitive call for proposals which indicates the high recognition of my research by the corresponding international evaluation panels. Finally, but not the less, the discoveries achieved in the last two years are due to the development a new ultra broad band receiver and spectrometers covering the complete Q-band (31-50 GHz) which has permitted to my team to reach sensitivities 50 times better than those previously performed with standard radio astronomical instrumentation. This novel instrumentation have been funded through my ERC synergy Grant “Nanocosmos”.

I consider that my work in this area has been fundamental in Astrochemistry and has constituted a scientific and observational challenge that I consider I have resolved satisfactorily. Some of these species, such as C_nH radicals, some metals, and several cations and anions, were found in space before they were observed in the laboratory. These results have originated a large number of scientific citations and has motivated a vast laboratory work by colleagues around the world in order to improve the knowledge of these species and the method of obtaining them in the laboratory.

Of special interest is the recent detection of indene (*c*-C₉H₈), cyclopentadiene (*c*-C₅H₆), fulvenallene(*c*-C₅H₄CCH₂), and benzyne (*c*-C₆H₄) in a cold dark cloud. Indene is the first pure hydrocarbon with aromatic character that has been unambiguously detected by the detection of 47 seven rotational transitions in the 31-50 GHz domain. Until the detection of these molecules, PAHs were considered to be formed in the expanding envelopes of carbon-rich evolved stars. Its detection in cold dark clouds represent a new paradigm in Astrochemistry. Cyclopentadiene and benzyne were unforeseen and unexpected species from the most sophisticated state-of-the-art models. The detection of these pure hydrocarbons represents an important breakthrough and a important step in my research in astrochemistry.

To carry out this research activity, I have created and maintained since 1980 a spectral catalog (MADrid molecular spectroscopy EXcitation code, MADEX) containing high frequency accuracy data for 6478 molecular species (by April 2023). It constitutes a tool basic research of my group and other scientists in the area. I have developed recognized radiative transfer codes and chemical models that allow to interpret, and quantitatively analyze, the emission of molecules from interstellar clouds, proto-planetary systems, and evolved stars. In addition, the radiative transfer codes that I and my group we have developed permit the analysis and interpretation of observations covering a wide spectral domain, from the near infrared to the spectral regions of the far infrared, submillimeter, millimeter and centimeter domains.

2) I have made a significant contribution to the study of water in space, both from ground-based observatories and from space platforms. Before disposing of space satellites Submillimeter Wave Astronomy Satellite (SWAS), Spitzer and Herschel, I have shown that the emission of water vapor took place in large areas of molecular clouds and regions of formation of stars (6 orders of magnitude in size compared to previous observations made at 22 GHz). To get these outstanding results, I used observatories at high altitude for which the atmospheric transmission at the frequency of the H₂O line at 183.3 GHz is up to 50%. This line, contrary to the 22 GHz maser line, corresponds to an easily excitable transition. With the ISO observatory, I made the first maps of the fundamental water lines in SgrB2 and Orion. I also obtained the complete spectrum of water, in the region of far infrared, in star formation regions and towards evolved stars. The interpretation of the results was carried out using the more advanced radiative transfer codes, which coupled the processes of absorption and emission of molecules in the gas phase and dust grainst. I have actively participate in the Key Programs of the Herschel dedicated to the study of water vapor in interstellar media and circumstellar. A significant number of my publications are devoted to studies of water emission/absorption in the interstellar and circumstellar media, and in the solar system.

3) In the specific field of Space Research my main scientific area of research between 1996 and 2000 was the study of the far-IR spectrum of molecular clouds and evolved stars with the Infrared Space Observatory (ISO). I wrote more than 60 papers on the molecular content of these objects in the far-IR showing the possibilities that this new window was offering to Molecular Astrophysics (water in space, carbon chains and clusters, benzene, light molecular species) and Astrophysics (physical and chemical properties of interstellar clouds). Many of these results were the basic science case for the spectroscopic instruments of the Herschel satellite of which I has been mission scientist since 1998.

2.1) INTERNATIONAL SCIENCE LEADERSHIP

I was co-director of the IRAM 30-m telescope for four years (1988-1992). During this period I had in charge the scientific quality control of the telescope data and the coordination of the science activities of the astronomers. This period represented a continuous interaction with

the technical staff to improve the scientific capacities of the telescope (upgrading the optics, observation at multiple frequencies simultaneously, improving the pointing, the calibration, and thermal control of the telescope,...).

I has been member of the Herschel Science Team and Mission Scientist of this satellite since 1998 until the end of the mission in 2016. I have been in charge of the science preparation of capacities of the satellite in the field of Molecular Astrophysics. In this context I have organized 3 workshops and 2 international conferences (3 in Leiden: Chemistry, Laboratory Data and H₂O; two in Toledo: "The promise of First" (2000; in this conference the name of FIRST was changed to Herschel) and "Astrochemistry in the Herschel and ALMA Era" (2011); and one in Madrid: "The future of far-IR after Herschel").

As Mission Scientist of Herschel I have been motivating the national and the European community for the use of this facility and to show astrophysicists of all fields the possibilities offered by the far-IR to explore the cold universe and to study key light molecular species, like H₂O, and their role in chemistry and in the physics of the ISM. As a result of my activity at the national level several groups of the Madrid Community are involved in the future SPICA far-infrared space platform.

I have promoted the interaction between astrophysicists and chemists in order to improve molecular rotational constants and collisional rates at the national and international level (in the context of ALMA and Herschel). I collaborate with astronomers and chemists worldwide (USA, Europe, Japan). **I have been member of all ALMA committees** either, as national representative in the executives, or as scientist in the ALMA Scientific Advisory Committee (Chairman of ASAC in 2007-2008). I have been working in several IPTs of ALMA since 1998. In 2006 **I was the chairman of the SOC of the global ALMA conference** held in Madrid (more than 350 participants) entitled "A New View of the Universe in the ALMA Era". **I have organized, as SOC member or chairman**, a large number of symposiums and conferences in the last 10 years. I have been one of four members (A. Dalgarno, L. Allamandola, E. van Dishoeck, J. Cernicharo) of the SOC of the conference funded by the **Nobel Foundation "Astrochemistry, Molecular Astrophysics" (Nobel Symposium 133)**.

I have been, and I am, member of several international evaluation panels of research projects funded by ESA, ESO, NASA, and of the European, Spanish, Czech, and French National Evaluation agencies. I have been member of the High Scientific Committee of the Paris Observatory and of several academic institutions. I have been member of the international commissioning teams of several radio astronomical facilities, in particular of the 30-m telescope (1984-1985) and of the Plateau de Bure interferometer (1986-1989) of IRAM. I have been member of several working groups of ALMA before it was opened to the community. I have also been member of several evaluation panels of the HIFI instrument on board Herschel.

The ASTROCAM, ASTROMOL and NANOCOSMOS (<https://nanocosmos.iff.csic.es/>) projects represent a substantial evolution in the field of Astrochemistry in Spain with a high impact worldwide. The ASTROCAM project of Madrid Community allowed me in establishing strong bonds with different chemical-physics groups that were at the basis of the Consolider project ASTROMOL (funded by the Spanish Ministry of Science with 4.8 M€). As a consequence of my leadership role in both projects I submitted a proposal, together with C. Joblin and J.A. Gago, to the ERC Synergy call of 2013. I has been the coordinator of the project. The Synergy projects are very well founded but difficult to obtain due to the high competition at European level. The Synergy project NANOCOSMOS has been funded with 15 M€. It represents a high degree of achievement in my scientific carrier.

2.2) NATIONAL LEADERSHIP

I have been involved since 1999 in the negotiations between Spain and ESO for the participation of my country in ALMA. Spain and ESO signed an agreement in 2002 concerning ALMA and in 2006 concerning the full membership of Spain in ESO. I was the Spanish delegate in the European ALMA Board from 1999 until 2003 and *observer* in the ALMA Board for the same period. In 2003 I created the Department of Molecular and Infrared Astrophysics at the CSIC. In 2008 we were 3 research professors, 1 researcher and 4 scientists as staff members plus 10 post-docs and students. The molecular astrophysics group moved to the Centro de Astrobiología in 2008 to participate in the creation of a larger department of Astrophysics. I was the director of this department between Oct 2008- Oct 2010 when I accepted the interim role of Scientific Vicedirector until December 2011. In 2014 and after the approval of NANOCOSMOS I am moving to the ICMM, the Institut of J.A. Gago (co-PI), to optimize the execution of the synergy project.

I have supervised 16 PhDs, and more than 15 master thesis. Most of my students are doing scientific research in Academia and have a solid international recognition. I have been teaching Molecular Astrophysics in the Master of Astrophysics of Madrid. I have been the coordinator of ASTROCAM, a program devoted to the creation of a network of groups of Astrophysics in the Madrid community (2006-2009) funded with 898,366 kEuros. I has been the PI of a CONSOLIDER project (ASTROMOL) funded by the Spanish MICINN/CSIC with 4.8 MEuros (2009-2016) that merges the expertise of 12 different groups from the CSIC and Universities in the fields of astrophysics, chemical physics, laboratory chemistry and spectroscopy. It addresses the problem of fundamental chemical reactions in the gas phase of molecules of astrophysical interest and to characterize their spectroscopic properties. Most of the funding corresponds to new laboratory equipment.

2.3) AWARDS

- 1998** Prize Betancourt-Perronet to the Spain-France scientific collaboration (Ministery des Affaires Etrangers, France).
- 2008** Prize to the scientific excellence “Gabriel Alonso Herrera” (Castilla La Mancha Community).
- 2018** Medal of the Royal Spanish Physical Society (RSEF).
- 2020** Prize to the scientific excellence “Miguel A. Catalán” (Madrid Community).
- 2022** National Prize for Scientific Research in Physical Sciences “Blas Cabrera” (Spanish Ministery of Science and Technology).

3) SEJOURS IN INTERNATIONAL INSTITUTS AND OBSERVATORIES

INSTITUT: *Observatoire de Meudon*

CITY: *París* **COUNTRY:** *Francia* **YEAR:** *1979*

NUMBER OF MONTHS: *1 YEAR* (fellowship)

SUBJECT: *PHYSICAL AND CHEMICAL PROPERTIES OF THE INTERSTELLAR MEDIUM*

INSTITUT: *Observatoire de Bordeaux*

CITY: *Bordeaux* **COUNTRY:** *Francia* **YEAR:** *1980-1981*

NUMBER OF MONTHS: *15 months* (fellowship)

SUBJECT: *COMMISSIONING TEAM OF THE RADIO TELESCOPE POM-I*

INSTITUT: *Observatoire de Meudon*

CITY: *Paris* **COUNTRY:** *Francia* **YEAR:** *1981-1982*

NUMBER OF MONTHS: *16 months* (fellowship)

SUBJECT: *PHYSICAL AND CHEMICAL PROPERTIES OF THE INTERSTELLAR MEDIUM*

INSTITUT: *Observatoire de Grenoble*

CITY: *Grenoble* **COUNTRY:** *Francia* **YEAR:** *1982-1983*

NUMBER OF MONTHS: *13 months* (fellowship)

SUBJECT: *PHYSICAL AND CHEMICAL PROPERTIES OF INTERSTELLAR MEDIUM.*

SPECTROSCOPY OF THE INTERSTELLAR MEDIUM

RADIATIVE TRANSFER IN THE INTERSTELLAR AND CIRCUMSTELLAR MEDIA

INSTITUT: *Observatoire de Grenoble e Institut de RadioAstronomie Millimétrique (IRAM)*

CITY: *Grenoble* **COUNTRY:** *Francia* **YEAR:** *1983-1988*

NUMBER OF MONTHS: *5 YEARS*

(Charge de Recherche en el Centre National de la Recherche Scientifique)

SUBJECT: *PHYSICAL AND CHEMICAL PROPERTIES OF THE INTERSTELLAR MEDIUM*

ESPECTROSCOPIA MOLECULAR MICROONDAS E INFRAROJA DE ALTA RESOLUCION

ESPECTROSCOPIA EN EL INTERSTELLAR MEDIUM Y CIRCUMESTELAR

COMMISIONING TEAM OF THE RADIO TELESCOPE POM-II (INSTRUMENTATION)

COMMISIONING TEAM OF THE IRAM 30-m RADIO TELESCOPE (INSTRUMENTATION)

*COMMISIONING TEAM OF THE IRAM INTERFEROMETER AT THE PLATEAU DE BURE
(INSTRUMENTACION)*

INSTITUT: *FCRAO OBSERVATORY OF THE UMASS UNIVERSITY (USA)*

GREEN BANK OBSERVATORY of the NATIONAL RADIOASTRONOMICAL OBSERVATORY (USA)

MWO OBSERVATORY OF THE UNIVERSITY OF AUSTIN (USA)

EFFELSBERG OBSERVATORY (MPIfR, GERMANY)

OBSERVATORY OF LA SILLA IN CHILE (EUROPEAN SOUTHERN OBSERVATORY)

NUMBER OF MONTHS: *SEVERAL WEEKS IN EACH OBSERVATORY* (research projects funded by Spanish MEC or MCYT, and by the FRENCH CNRS -prior to 1988-)

SUBJECT: *RADIOASTRONOMICAL OBSERVATIONS*

INSTITUT: INSTITUT D'ASTROPHYSIQUE DE PARIS
CITY: PARIS **COUNTRY:** FRANCE **YEAR:** 1992-1993
NUMBER OF MONTHS: 4 months (**Invited. Funded by the IAP**)
SUBJECT: EVOLVED STARS

INSTITUT: MAX PLANCK INSTITUT FUR RADIOASTRONOMIE
CITY: Bonn **COUNTRY:** GERMANY **YEAR:** 1993
NUMBER OF MONTHS: 3 months (**Invited. Co-Funded by DGCICYT(30%) and the MPG (70%)**)
SUBJECT: VLBI

INSTITUT: INSTITUTE DE RADIOASTRONOMIE MILLIMETRIQUE (IRAM)
CITY: GRENOBLE **COUNTRY:** FRANCE **YEAR:** 1994
NUMBER OF MONTHS: 2 months (**Invited and funded by the IRAM**)
SUBJECT: ANALYS OF PROCEDURES FOR INTERFEROMETRIC OBSERVATIONS. EVOLVED STARS. INTERSTELLAR MEDIUM.

INSTITUT: OBSERVATOIRE DE BORDEAUX
CITY: BORDEAUX **COUNTRY:** FRANCE **YEAR:** 1995
NUMBER OF MONTHS: 1 month (**Invited Profesor of the Bordeaux University. Funded by the French "Ministère de l'Education Nationale"**)
SUBJECT: EVOLVED STARS

INSTITUT: INSTITUT D'ASTROPHYSIQUE DE PARIS
CITY: PARIS **COUNTRY:** FRANCE **YEAR:** 1997
NUMBER OF MONTHS: 1 month (**Prize Betancourt-Perronet**)
SUBJECT: EVOLVED STARS and INFRARED ASTRONOMY

INSTITUT: OBSERVATOIRE DE BORDEAUX
CITY: BORDEAUX **COUNTRY:** FRANCE **YEAR:** 1998
NUMBER OF MONTHS: 1 month (**Prize Betancourt-Perronet**)
SUBJECT: INTERSTELLAR MEDIUM

INSTITUT: INSTITUT D'ASTROPHYSIQUE SPATIALE
CITY: PARIS **COUNTRY:** FRANCE **YEAR:** 1998
NUMBER OF MONTHS: 3 months (**Prize Betancourt-Perronet**)
SUBJECT: EVOLVED STARS AND INFRARED ASTRONOMY

INSTITUT: Ecole Normale Supérieur de Paris
CITY: PARIS **COUNTRY:** FRANCE **YEAR:** 1999 (February)
NUMBER OF MONTHS: 3 weeks (**Prize Betancourt-Perronet**)
SUBJECT: INTERSTELLAR MEDIUM

INSTITUT: IRAM
CITY: GRENOBLE **COUNTRY:** FRANCE **YEAR:** 1999 (April/May)

NUMBER OF MONTHS: 2 months (**Prize Betancourt-Perronet**)
SUBJECT: EVOLVED STARS, INTERSTELLAR MEDIUM AND RADIOASTRONOMY

INSTITUT: IRAM
CITY: GRENOBLE **COUNTRY:** FRANCE **YEAR:** 1999 (July/August)
NUMBER OF MONTHS: 2 months (**Prize Betancourt-Perronet**)
SUBJECT: EVOLVED STARS, INTERSTELLAR MEDIUM AND RADIOASTRONOMY

INSTITUT: INSTITUT OF TECHNOLOGY OF CALIFORNIA (CALTECH)
CITY: PASADENA (CA) **COUNTRY:** USA **YEAR:** 2000 (Jul-Nov)
NUMBER OF MONTHS: 5 months (**Visiting associated in Physics**)
SUBJECT: FIRST. MILLIMETER AND SUBMILLIMETER OBSERVATIONS

INSTITUT: Ecole Normale Supérieur de Paris
CITY: PARIS **COUNTRY:** FRANCE **YEAR:** 2001 (April)
NUMBER OF MONTHS: 1 month (**Invited Professor of the Ecole Normale Supérieure de Paris**)
SUBJECT: INTERSTELLAR MEDIUM

INSTITUT: INSTITUT OF TECHNOLOGY OF CALIFORNIA (CALTECH)
CITY: PASADENA (CA) **COUNTRY:** USA **YEAR:** 2001 (Jun-Nov)
NUMBER OF MONTHS: 6 months (**Visiting associated in Physics**)
SUBJECT: FIRST (HERSCHEL) and ALMA. SUBMILLIMETER OBSERVATIONS

INSTITUT: CENTRE D'ETUDES SPATIALES ET DU RAYONNEMENT
CITY: TOULOUSE **COUNTRY:** FRANCE **YEAR:** 2002
NUMBER OF MONTHS: 2 months (**Invited Professor**)
SUBJECT: PREPARATION OF THE SCIENTIFIC PROGRAM OF HERSCHEL : HIGH RESOLUTION ESPECTROSCOPY IN THE FAR INFRARED : CARBON CLUSTERS

INSTITUT: OBSERVATOIRE DE PARIS
CITY: PARIS **COUNTRY:** FRANCE **YEAR:** 2002
NUMBER OF MONTHS: 1 month (**Invited Professor**)
SUBJECT: PREPARATION OF THE SCIENTIFIC PROGRAM OF HERSCHEL : MOLECULAR ASTROPHYSICS

INSTITUT: OBSERVATOIRE DE PARIS AND CESR TOULOUSE
CITY: PARIS **COUNTRY:** FRANCE **YEAR:** 2003
NUMBER OF MONTHS: 2 month (**Invited Professor**)
SUBJECT: PREPARATION OF THE SCIENTIFIC PROGRAM OF HERSCHEL : MOLECULAR ASTROPHYSICS. MODELLING OF H2O USING NEW COLLISIONAL CROSS SECTIONS.

INSTITUT: OBSERVATOIRE DE BORDEAUX
CITY: BORDEAUX **COUNTRY:** FRANCE **YEAR:** 2006

NUMBER OF MONTHS: 1 month (**Invited Professor**)

SUBJECT: PREPARATION OF THE SCIENTIFIC PROGRAM OF HERSCHEL : MOLECULAR SURVEYS OF ORION

INSTITUT: OBSERVATORY OF GRENOBLE

CITY : GRENOBLE **COUNTRY:** FRANCE **YEAR:** 2007-2008

NUMBER OF MONTHS: 12

SUBJECT: PREPARATION OF THE SCIENTIFIC PROGRAM OF HERSCHEL. MOLECULAR LINE SURVEYS, WATER IN PROTOPLANETARY DISKS, COMPARISON OF X-RAYS AND MOLECULAR EMISSION IN ORION

INSTITUT: UNIVERSITY OF PARIS SUD-CRETEIL

CITY : PARIS **COUNTRY:** FRANCE **YEAR:** 2013

NUMBER OF MONTHS: 2

SUBJECT: MOLECULES WITH INTERNAL ROTORS. DETECTION IN SPACE OF METHYL ACETATE

INSTITUT: UNIVERSITY PAUL SABATIER (IRAP)

CITY : TOULOUSE **COUNTRY:** FRANCE **YEAR:** 2011-....

NUMBER OF MONTHS: typically 5-10 sejours of 1-2 weeks per year (Nanocosmos project)

SUBJECT: ASTROCHEMISTRY. ALMA. CARBON CHEMISTRY. PDRs

4) DESCRIPTION OF RELEVANT ACTIVITIES

1980	Participant in the Goutelas School (France; 1 week) devoted to "The role of molecular clouds in star formation".
1982	Participant on the International School of Les Houches (1 month) devoted to "Birth and Infance of Stars"
1984 and 1988	Organizer of the courses of "Introducción a la radioastronomía" for Operators of the 30-m IRAM radio telescope and for young Ph.D. students of the University of Granada (Spain).
1984-1985	Member of the Commissioning Team of the 30-m IRAM radio telescope.
1983-...	Referee of Astronomy & Astrophysics, MNRAS, and the Astrophysical Journal
1986-...	Member of the Société Francaise des Specialistes d'Astronomie
1986-1988	Member of the Commissioning Team of the interferometer of the Plateau de Bure (IRAM, France).
1987	Referee of "Proposals" for several radio telescopes
1987-...	Member of the jury of the Ph.D. of J. Braine, G. Duvert, B. Le Floch, P. Marechal, S. Blinder, J.R. Pardo, D. Fossé, J.R. Goicoechea. Universities of Paris, Grenoble, Burdeos and Madrid.
1988-1992	Co-Director of the Observatory of Pico Veleta (IRAM)
1989	Participant in the course of vectorial computers of CASA (Spain)
1990-1994	Member of the Spanish National Committee of Astronomy and Astrophysics
1990	Doctoral courses in the Univ. of Granada (4 créditos) : "Propiedades Físicas de las regiones de Formación de Estrellas de Baja Masa"
1990	Invited lecture in the NATO ADVANCED PHYSICS COURSE (Creta) "The Physical Conditions of Low Mass Star Forming Regions".
1990-...	Referee of the Spanish Agency for Evaluation and Prospective
1991-...	President of several Ph.D. committees in Spain and France
1990-1992	Member of the "Physics and Mathematics" Committee of the Spanish Agency for Evaluation and Prospective
1991-1992	Member of the IRAM OTAC (30-m and interferometer)
1993	Member of the OTAC of Calar Alto
1993	Chairman of the IRAM OTAC
1993	Member of the ISO's OTAC for ISM
1994	Several open time projects accepted for ISO. An important fraction of the available time for ISM granted to my proposals. Six projects as PI and Co-I in 10 projects
1994-1996	Responsible of the "mise in operation" of the optical telescope of 1.52 m of the OAN in Calar Alto (until May 1996). Development of the software for the real time control of the telescope and of the user interface.
1996	Member of the ISO's OTAC for the second call for proposals
1996	Member of the Committee of experts for the FIRST satellite of ESA
1996	Six new projects accepted in the ISO's open time
1997	Award of the French government to the scientific and technical cooperation between Spain and France "Prix Betancourt-Perronet".
1998-2000	Doctoral courses in the University of La Laguna (Canary Islands) on Molecular Astrophysics
1998	Member of the American Astronomical Society
1998	Member of the SOC of the Conference "The Universe as seen by ISO"
1998-2011	Mission Scientist of the FIRSTS satellite of ESA (in collaboration with NASA)
1998-...	Member of the FIRST (Herschel) Science Team of ESA
1999	Member of the Panel Review of the HIFI instrument for Herschel (JPL, January 1999)
2000	Member of the SOC of the Conference "Isoppeaks" February 2000
2000	Co-Chairman of the SOC of the Conference "The Promise of FIRST"
2000	Chairman of the LOC on the Conference "The Promise of FIRST"
2001	Teacher of the IRAM summer school

2001	Teacher of the Winter School of the Canary Island Institute for Astrophysics (Cosmochemistry)
2002	Member of the Soc of the Conference "Science with the ISO Database"
2000-2002	Spanish delegate in the ALMA European Coordination Committee
2002	Member of evaluation committee of the activity of the CESR (Toulouse, France) during for the period 1998-2002
2003	Chairman of the Conference "New Perspectives for post-Herschel far-IR astronomy from Space" Madrid 1-4 Sept, 2003
2003	Chairman of the 1 st Spanish National Conference on Molecular Astrophysics. Ciudad-Real, 1-4 December 2003
2003-2005	Member of the Astronomical Working Group of ESA
2003	Member of the Scientific and Technical Advisory Committee of the Large Millimeter Telescope (USA/México)
2003	Teacher in the 2nd IRAM summer School
2003	Member of the SOC the Zermatt Conference
2003-2005	Spanish Delegate in the European ALMA Board
2003	Spanish Observer in the ALMA Board
2004	Organizer of the multidisciplinar Workshop "Preparatory Science of Herschel & ALMA" in the Lorentz Center of the Leiden University (Holland). December 15-17, 2004
2004	Member of the Scientific Organizing Committee of "The Dusty Universe". Paris October 2004
2005-2009	Member of the Scientific Committee of the French National Program "Physico-Chimie du Milieu Interstellaire"
2005	Member of the SOC of the meeting funded and organized by The Nobel Fundación "Cosmochemistry : Molecular Astrophysics" (SOC: A. Dalgarno, L. Allamandola, E. van Dishoeck, J. Cernicharo) that was hold in 2006
2006	Chairman of the SOC of the pan-ALMA meeting ALMA 2006 : A New Era for Astrophysics. Madrid, Nov 13-17 2006
2005-2006	Member of the UE ESFRI experts committee "Astrophysics and Astroparticles"
2006-2009	Member of the Haut Comité Scientifique de l'Observatoire de Paris
2006-2008	Member of the ALMA Scientific Advisory Committee. Chair in 2007-2008
2007-2008	Member of the Astrophysics Panel PE7 of the Starting Grants of the ERC
2008	Prize of Scientific Excellence of the Junta de Comunidades de Castilla La Mancha "Gabriel Alonso Herrero"
2008	Member of the evaluation Panel of the Laboratoire de Physique, Lasers et Moléculas of the University of Lille (France)
2008	Member of the Board Panel of "Instrument Flight Acceptance Review" of Herschel
2009-2010	Member of different Board Panels of Herschel and its instruments
2008-2010	Member of the panel PE9 of the ERC Startings Grants
2010	Member of the SOC of the ESLAB conference on the first results of Herschel
2010	Member of the Scientific Organising Committee of the Zermatt Conference
2010	Member of the SOC of the conference "Synergy ALMA-HERSCHEL"
2011	Member of the SOC of the conference "The Molecular Universe" IAU N280
2011	Chairman of the LOC of the conference "The Molecular Universe" IAU N280
2011	Chairman of the panel "Stellar Evolution, Solar System and the Sun" of the ALMA program committe
2012	Profesor of the LAPIS 2012 School focused in the LLAMA Argetina-Brasil project. 13-18 Agosto 2012.
2012	Chairman of the SOC and teacher of the COSPAR School "Infrared and Submillimetre Astronomy". 15-26 October 2012. Buenos Aires (Argentina)
2012	Miembro del SOC de la Conferencia Internacional "New Trends in Radio Astronomy in the ALMA Era". Hakone, Japan, 3-8 December 2012
2012	Chairman del SOC de la "2 ^a NATIONAL CONFERENCE ON LABORATORY AND MOLECULAR ASTROPHYSICS". Nov 14-16, 2012, Sevilla, Spain

2014-2020	Principal investigator and coordinator of the ERC Synergy NANOCOSMOS funded with 15 MEuros.
2014	Director and professor at the International School of Astrochemistry "Astrochemistry's cool", Sep 14-18 2014, Cuenca, Spain
2014	Professor of the International School of Spectroscopy "New experimental and theoretical developments in molecular spectroscopy : pushing the limits", Corcega, 7-13 Septiembre 2014
2016	Director of the international school Guillermo Haro on Molecular Astrophysics, October 2016, INAOE, Puebla, Mexico
2016	Chairman of the SOC of the 2nd European Conference on Laboratory Astrophysics. Madrid, November 2016
2016	Member of Panel 9 of ERC Advanced Grants
2018	Medal of the Spanish Royal Society of Physics
2018	Member of Panel 9 of ERC Advanced Grants
2020	Prize to the scientific career "Miguel A. Catalán". Madrid Gouvernement
2020 & 2022	Member of Panel 9 of ERC Advanced Grants
2021-2022	Member of the panel EX1 of the Czech Evaluation Agency (Physics and Astrophysics)
2022	National Research Prize in Physical Sciences "Blas Cabrera". Spanish Ministry of Science and Innovation

5) FUNDED RESEARCH PROJECTS IN THE LAST 20 YEARS:

I have been PI of the following research projects:

- **PB96-0883**, “Astronomía Infrarroja con el satélite ISO”, 1997-1999 (51.134,11 €),
- **ESP96-2529-E**, “Actividad Científica durante 1996-1997 satélite ISO” (8.714,73 €),
- **ESP97-1618-E**, “Actividad como Mission Scientist de Herschel” (9.892,66 €),
- **ESP98-1545**, “Actividad como Mission Scientist de Herschel”, (30.050,61 €),
- **ESP98-1351** “Fase de postoperaciones del satélite ISO” 1999-2001 (51.867,00 €),
- **ESP1999-1467** “Actividad como Mission Scientist 2º año” 2000-2001 (30.050,61€),
- **PNAYA2000-A1784** “Astrofísica Molecular: El legado de ISO y el futuro de FIRST y ALMA” , 2001-2003 (121.164 €)
- **ESP2001-4516-PE** “Preparación del Programa Científico del satélite Herschel de la ESA y Actividad de J. Cernicharo como mission Scientist” (32.310.41 €)
- **ESP2002-11650** “Workshop internacional sobre new perspectivas for post Herschel far infrared astronomy from space” 2003 (9.000€)
- **AYA2002-12125** “Primer Congreso Nacional de Astrofísica Molecular”, 2003 (12.000€)
- **HF2003-0293** “Cálculos Mecano-Cuánticos de Moléculas de interés Astrofísico: Preparación científica de Herschel y ALMA”, 2004-2005 (10.404€)
- **AYA2003-02785** “Preparación de la Explotación Científica y Contribución Científico Técnica” 2003-2006 (319.415 €),
- **ASTROCAM S-0505 ESP0237**, 2005-2008 (898.366€),
- **MRTN-CT-2004-512302** “Molecular Universe”, UE, 2005-2008 (167.201,85 €),
- **ESO N° Reg. OTT 200550573** “Agreement for the development of software for the Atacama Large Millimetre Array (ALMA)” 2005-2008 (177.223 €).
- **AYA2006-14876** “Astrofísica Molecular con Herschel y ALMA”, 2007-2009 (313.390€)
- **AYA2009-07304**, "Molecular Astrophysics, the Herschel and ALMA Era" 2009-2012, Dec 2009-Dec 2012 (312.180 Euros)
- **CSD2009-00038**, "ASTROMOL: Astrofísica Molecular" Proyecto del Programa Consolider, 2009-2016 (4.800.000 Euros)
- **ERC-2013-SyG, Grant Agreement n. 610256 NANOCOSMOS**: "Gas and Dust from the Stars to the Laboratory: Exploring the nano-cosmos". 2014-2020 (15 M€). PI and coordinator of the Project.

I have participated in the following research projects:

- **AYA2002-10113** “Diseño y estudio de viabilidad de la contribución española (en especie) a la construcción de Atacama Large Millimetre Array ALMA”, 2003-2004 (194.092€)
- **ESP 2002-12407** “Herschel: Contribución al Centro Control del Instrumento HIFI. Desarrollo, herramientas, análisis de datos de cartografías espectrales”, 2003-2004 (3.000€)
- **ESP2002-01627**, “Herschel: Contribución al Centro Control del Instrumento HIFI y al programa Científico”, 2003-2004 (241.820€)
- **ESP2004-665**, “Herschel: Contribución al Centro de Control del Instrumento HIFI y al programa Científico”, 2005-2007 (365.200€)
- **AYA2005-24101** “Science with ALMA: A new era for Astrophysics” 2006 (12.000€)
- **ESP2007-65812-C02-01** “Herschel: Contribución al Centro de Control del Instrumento HIFI y al programa Científico”, 2007-2010 (536.030€)
- **ESO N° Registro OTT 20071081**, “Execution of Laboratory Calibration Tests for the ALMA Calibration System”, 2007-2008 (42.000€)
- **ESO N° Registro OTT 20071080**, “development of software for the Atacama Large Millimeter Array (ALMA), 2007-2011 (53.820€)
- **AYA2012-33032** "Physics and Chemistry of the Interstellar and Circumstellar Media in the ALMA Era", IP Javier Rodriguez Goicoechea. 2013-2015 (369.720€)
- **AYA2016-75066-C2-1-P** “Evolución física y química del Medio Interestelar, Circunestelar y Planetario”, 2017-2019 (191.000€)

6) DOCTORAL AND MASTER THESIS

Adviser of the following Master thesis:

- 1) **TITLE:** PROPIEDADES FISICAS DEL MEDIO INTERESTELAR
STUDENT : Eduardo González Alfonso
UNIVERSITY : VALENCIA **FACULTY/SCHOOL:** PHYSICS
YEAR 1991 **NOTE** SOBRESALIENTE
- 2) **TITLE:** QUIMICA DE LAS ENVOLTURAS CIRCUMESTELARES
STUDENT : Javier Tejero Ordoñez
UNIVERSITY : AUTONOMA DE MADRID **FACULTY/SCHOOL:** CIENCIAS
QUIMICAS
YEAR 1991 **NOTE** SOBRESALIENTE
- 3) **TITLE:** TRANSMISION DE ONDAS ELECTROMAGNETICAS EN LA ATMOSFERA TERRESTRE
STUDENT : Juan Ramón Pardo Carrión
UNIVERSITY : COMPLUTENSE **FACULTY/SCHOOL:** PHYSICS
YEAR 1993 **NOTE** SOBRESALIENTE
- 4) **TITLE:** ASTROFISICA MOLECULAR EN EL INFRARROJO LEJANO: NUBES Y ENVOLTURAS MOLECULARES DENSAS
STUDENT : Javier Rodríguez Goicoechea
UNIVERSITY : AUTONOMA DE MADRID **FACULTY/SCHOOL:** PHYSICS
YEAR 2001 **NOTE** SOBRESALIENTE (con felicitaciones del jurado)
- 5) **TITLE:** LA ZONA DE FORMACIÓN DE GRANOS DE POLVO DE IRC+10216.
STUDENT : Pablo Fondría Exposito
UNIVERSITY : COMPLUTENSE DE MADRID **FACULTY/SCHOOL:** PHYSICS
YEAR 2005 **NOTE** SOBRESALIENTE
- 6) **TITLE:** QUÍMICA EN ESTRELLAS EVOLUCIONADAS
STUDENT : Marcelino Agúndez
UNIVERSITY : AUTONOMA DE MADRID **FACULTY/SCHOOL:** SCIENCES
YEAR 2005 **NOTE** SOBRESALIENTE
- 7) **TITLE:** THE MOLECULAR CONTENT OF ORION-IRC2.
STUDENT : Belen Tercero
UNIVERSITY : COMPLUTENSE DE MADRID **FACULTY/SCHOOL:** PHYSICS
YEAR 2005 **NOTE** SOBRESALIENTE

Adviser of the following doctoral thesis (Ph.D.):

- 1) **TITLE:** ETUDE DE L'EMISSION MOLECULAIRE DES NUAGES DU TAUREAU (Thèse de 3^{ème} cycle).
CANDIDATE : G. DUVERT
UNIVERSITY : SCIENTIFIQUE ET MEDICALE DE GRENOBLE
FACULTY/SCHOOL: PHYSIQUE
YEAR 1987
QUALIFICATION Très Honorable
COMMENTS: CO-ADVISER

- 2) **TITLE:** TRANSFERENCIA DE RADIACION EN NUBES MOLECULARES Y EN ESTRELLAS EVOLUCIONADAS
Candidate : Eduardo González Alfonso
University : U. VALENCIA **FACULTY/SCHOOL :** FISICAS
YEAR 1995
QUALIFICATION Apto Cum Laude by Unanimity
- 3) **TITLE:** EFECTOS DE LA ATMOSFERA TERRESTRE EN LA PROPAGACION DE ONDAS ELECTROMAGNETICAS
Candidate : Juan Ramón Pardo Carrión
University : U. PARIS **FACULTY/SCHOOL :** FISICAS
YEAR 20 de DICIEMBRE 1996- Université de Paris VII **QUALIFICATION** Très Honorable avec les félicitations du Jury
COMMENTS: CO-ADVISER
- 4) **TITLE:** LES HYDROCARBURES DANS LE MILIEU INTERSTELLAIRE : DES NUAGES SOMBRES AUX REGIONS DE PHOTODISSOCIATION
Candidate : David Fossé
University : U. PARIS **FACULTY/SCHOOL :** Physiques
YEAR 12 de JUNIO del 2003 - Université de Paris VI -Pierre et Marie Curie
QUALIFICATION : Très Honorable avec les félicitations du Jury
COMMENTS: CO-ADVISER
- 5) **TITLE:** ASTROFÍSICA MOLECULAR : DE LAS NUBES INTERESTELARES A LAS ENVOLTURAS CIRCUNESTELARES
Candidate : Javier Rodríguez Goicoechea
University : UNIVERSITY Autónoma de Madrid **FACULTY/SCHOOL :** Ciencias Físicas
YEAR Septiembre del 2003
QUALIFICATION : Apto cum laude by Unanimity
- 6) **TITLE:** TRANSPORTE RADIATIVO EN LÍNEAS MOLECULARES. APLICACIONES EN ASTROFÍSICA
Candidate : Andrés Asensio Ramos
University : UNIVERSITY de la Laguna **FACULTY/SCHOOL :** Ciencias Físicas
YEAR Junio del 2004
QUALIFICATION : Apto cum laude by unanimity (price of the Spanish astronomical Society to the best PhD of the Year 2004)
COMMENTS : CO-ADVISER
- 7) **TITLE:** THE EXCITATION OF NNH⁺ IN MOLECULAR CLOUDS
Candidate : Fabien Daniel
University : UNIVERSITE DE PARIS **FACULTY/SCHOOL :** Sciences Physiques
YEAR February 2007
QUALIFICATION : Apto cum laude by Unanimity
COMMENTS : CO-ADVISER
- 8) **TITLE:** EL CONTENIDO MOLECULAR DE NUBES FRÍAS
Candidate : Nuria Marcelino
University : UNIVERSITY DE GRANADA **FACULTY/SCHOOL :** Ciencias Físicas
YEAR June 2007
QUALIFICATION : Apto Cum Laude by Unanimity
COMMENTS : CO-ADVISER
- 9) **TITLE:** ASTROFÍSICA MOLECULAR EN EL INFRARROJO TERMICO : EL CASO DE IRC+10216
Candidate : Pablo Fonfría Exposito
University : Univ. Complutense de Madrid **FACULTY/SCHOOL :** Ciencias Físicas

YEAR July 2008

QUALIFICATION : Apto Cum Laude by Unanimity

- 10) **TITLE:** PROCESOS QUÍMICOS EN ESTRELLAS EVOLUCIONADAS
CANDIDATE : Marcelino Agúndez
UNIVERSITY : Univ. Autónoma de Madrid **FACULTY/SCHOOL :** Ciencias Físicas
YEAR September 2008
QUALIFICATION : Apto Cum Laude by Unanimity
- 11) **TITLE:** CONDICIONES FÍSICAS Y QUÍMICAS DEL GAS ALREDEDOR DE ESTRELLAS JÓVENES MASIVAS
CANDIDATE : Belen Tercero
UNIVERSITY : Univ. Complutense de Madrid **FACULTY/SCHOOL :** Ciencias Físicas
YEAR 25 May 2012
QUALIFICATION : Apto Cum Laude by Unanimity
- 12) **TITLE:** COMPLEJIDAD FÍSICA Y QUÍMICA EN LA NUBE MOLECULAR DE ORIÓN KL
CANDIDATE : Gisela Baño Esplugues
UNIVERSITY : Univ. Complutense de Madrid **FACULTAD/ESCUELA :** Ciencias Físicas
YEAR 26 Junio 2014
QUALIFICATION : Apto Cum Laude by unanimity
- 13) **TITLE:** COMPLEJIDAD MOLECULAR EN ENVOLTURAS DE ESTRELLAS EVOLUCIONADAS: ESTUDIO DETALLADO DE LA EMISIÓN MOLECULAR DE LOS OBJETOS IKTAU, OH₂31.8+4.2 E IRC+10216
CANDIDATE : Luis Velilla Prieto
UNIVERSITY : Univ. Complutense de Madrid **FACULTAD/ESCUELA :** Ciencias Físicas
YEAR 9 Junio 2017
QUALIFICATION : Apto Cum Laude by unanimity
- 14) **TITLE:** UN ESTUDIO DE LA REGIÓN DE FOTODISOCIACIÓN DE LA BARRA DE ORION
CANDIDATE : Sara Cuadrado
UNIVERSITY : Univ. Autónoma de Madrid **FACULTAD/ESCUELA :** Ciencias Físicas
YEAR 15 September 2017
QUALIFICATION : Apto Cum Laude by unanimity
- 15) **TITLE:** QUÍMICA DE MOLÉCULAS ORGÁNICAS EN REGIONES DE FORMACIÓN DE ESTRELAS MASIVAS
CANDIDATE : Alicia López Jiménez
UNIVERSITY : Univ. Autónoma de Madrid **FACULTAD/ESCUELA :** Ciencias Físicas
YEAR 13 September 2017
QUALIFICATION : Apto Cum Laude by unanimity
- 16) **TITLE:** AN OBSERVATIONAL STUDY OF MOLECULAR DUST PRECURSORS IN CIRCUMSTELLAR ENVELOPES
CANDIDATE : Sarah Massalkhi
UNIVERSITY : Univ. Autónoma de Madrid **FACULTAD/ESCUELA :** Ciencias Físicas
YEAR 18 December 2020
QUALIFICATION : Apto Cum Laude by unanimity

ANNEX I

LIST OF PUBLICATIONS IN INTERNATIONAL JOURNALS WITH REFEREE

(I have only included publications in *Astronomy and Astrophysics*, in the *Astrophysical Journal*, and in *JOURNALS with referee in other scientific fields*. For invited talks, and proceedings see ANNEX II)

1981

- 1) **AUTHORS:** A. Baudry, **J. Cernicharo**, M. Péault, D. Despois, J. de La Noë
TITLE: OBSERVATIONS OF HCO⁺, H¹³CO⁺,¹³CO AND C¹⁸O IN TAURUS CLOUDLETS
JOURNAL: *Astronomy and Astrophysics*, **104**, 101-115, **1981**

1982

- 2) **AUTHORS:** M. Guélin, **J. Cernicharo**, R.A. Linke
TITLE: DETECTION OF HC¹⁷O⁺ IN SGR B2
JOURNAL: *Astrophysical Journal Letters*, **263**, L89-L93, **1982**

1983

- 3) **AUTHORS:** A. Baudry, **J. Cernicharo**, M. Péault, D. Despois, J. de La Noë
TITLE: OBSERVATIONS OF HCO⁺, H¹³CO⁺,¹³CO AND C¹⁸O IN TAURUS CLOUDLETS
JOURNAL: *Astronomy and Astrophysics*, **104**, 101-115, **1981**
- 4) **AUTHORS:** M. Guélin, **J. Cernicharo**, R.A. Linke
TITLE: DETECTION OF HC¹⁷O⁺ IN SGR B2
JOURNAL: *Astrophysical Journal Letters*, **263**, L89-L93, **1982**
- 5) **AUTHORS:** V. Bujarrabal, **J. Cernicharo**, M. Guélin
TITLE: THE ISOTOPIC ABUNDANCE OF INTERSTELLAR OXYGEN DERIVED FROM 18-CM LINE OBSERVATIONS
JOURNAL: *Astronomy and Astrophysics*, **128**, 355-361, **1983**

1984

- 6) **AUTHORS:** **J. Cernicharo**, M. Guélin, J. Askne
TITLE: TMC1-LIKE CLOUDLETS IN HCL2
JOURNAL: *Astronomy and Astrophysics*, **138**, 371-379, **1984**
- 7) **AUTHORS:** **J. Cernicharo**, A.Castets, G.Duvert, S.Guilloteau
TITLE: LARGE SCALE HCN HYPERFINE ANOMALIES
JOURNAL: *Astronomy and Astrophysics Letters*, **139**, L13-L15, **1984**

- 8) **AUTHORS:** J. Cernicharo, R. Bachiller
TITLE: A CATALOGUE OF VISUAL EXTINCTION IN TAURUS AND PERSEUS
JOURNAL: *Astronomy and Astrophysics Suppl. Series*, **58**, 327-350, **1984**
- 9) **AUTHORS:** R. Bachiller, J. Cernicharo
TITLE: MOLECULAR OBSERVATIONS OF B1 : A DENSE GLOBULE IN PERSEUS
JOURNAL: *Astronomy and Astrophysics*, **140**, 414-420, **1984**

1985

- 10) **AUTHORS:** J. Cernicharo, R. Bachiller, G. Duvert
TITLE: THE TAURUS-AURIGA-PERSEUS COMPLEX OF DARK CLOUDS :: I. DENSITY STRUCTURE
JOURNAL: *Astronomy and Astrophysics*, **149**, 273-282, **1985**
- 11) **AUTHORS:** U. Mebold, J. Cernicharo, L. Velden, C. Crezelius, K. Reif
TITLE: THE DRACO NEBULA : A MOLECULAR CLOUD IN THE GALACTIC HALO ?
JOURNAL: *Astronomy and Astrophysics*, **151**, 427-434, **1985**

1986

- 12) **AUTHORS:** J. Cernicharo, R. Bachiller, G. Duvert
TITLE: NEW HC₇N CLOUDLETS IN TAURUS
JOURNAL: *Astronomy and Astrophysics*, **160**, 181-184, **1986**
- 13) **AUTHORS:** G. Duvert, J. Cernicharo, A. Baudry
TITLE: A MOLECULAR SURVEY OF THREE DARK CLOUDS IN TAURUS
JOURNAL: *Astronomy and Astrophysics*, **164**, 349-357, **1986**
- 14) **AUTHORS:** R. Bachiller, J. Cernicharo
TITLE: THE RELATION BETWEEN CARBON MONOXIDE EMISSION AND VISUAL EXTINCTION IN THE LOCAL PERSEUS DARK CLOUDS
JOURNAL: *Astronomy and Astrophysics*, **166**, 283-290, **1986** see erratum in A&A 1987, **174**, 368
- 15) **AUTHORS:** Bachiller, J. Cernicharo
TITLE: PHYSICAL AND CHEMICAL CONDITIONS IN PERSEUS GLOBULES FROM NH₃ AND HC₃N OBSERVATIONS
JOURNAL: *Astronomy and Astrophysics*, **168**, 262-270, **1986**
- 16) **AUTHORS:** M. Guélin, J. Cernicharo, C. Kahane, J. Gómez-González
TITLE: A NEW FREE RADICAL IN IRC+10216
JOURNAL: *Astronomy and Astrophysics*, **157**, L17-L20, **1986**
- 17) **AUTHORS:** J. Cernicharo, C. Kahane, J. Gómez-González, M. Guélin
TITLE: TENTATIVE DETECTION OF C₅H IN IRC+10216
JOURNAL: *Astronomy and Astrophysics*, **164**, L1-L4, **1986**
- 18) **AUTHORS:** J. Cernicharo, C. Kahane, J. Gómez-González, M. Guélin
TITLE: DETECTION OF ²⁹SiC₂ AND ³⁰SiC₂ TOWARDS IRC+10216
JOURNAL: *Astronomy and Astrophysics*, **167**, L9-L12, **1986**
- 19) **AUTHORS:** J. Cernicharo, C. Kahane, J. Gómez-González, M. Guélin
TITLE: DETECTION OF THE ²Pi_{3/2} STATE OF C₅H
JOURNAL: *Astronomy and Astrophysics*, **167**, L5-L7, **1986**

- 20) **AUTHORS:** J. Gómez-González, M. Guélin, **J. Cernicharo**, C. Kahane, M. Boggie
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224) AUTHORS: **Cernicharo, J.**, Decin, L., Barlow, M. J., Agundez, M., Royer, P., Vandenbussche, B., Wesson, R., Polehampton, E. T., De Beck, E., Blommaert, J. A. D. L., Daniel, F., De Meester, W., Exter, K. M., Feuchtgruber, H., Gear, W. K., Goicoechea, J. R., Gomez, H. L., Groenewegen, M. A. T., Hargrave, P. C., Huygen, R., Imhof, P., Ivison, R. J., Jean, C., Kerschbaum, F., Leeks, S. J., Lim, T. L., Matsuura, M., Olofsson, G., Posch, T., Regibo, S., Savini, G., Sibthorpe, B., Swinyard, B. M., Vandenbussche, B., Waelkens, C.

TITLE: DETECTION OF ANHYDROUS HYDROCHLORIC ACID, HCl, IN IRC+10216 WITH THE HERSCHEL SPIRE AND PACS SPECTROMETERS

JOURNAL: *Astronomy & Astrophysics*, 518, L136 (4 pages), 2010

225) AUTHORS: **Cernicharo, J.**, Goicoechea, J. R., Daniel, F., Agundez, M., Caux, E., de Graauw, T., De Jonge, A., Kester, D., Leduc, H. G., Steinmetz, E., Stutzki, J., Ward, J. S.

TITLE: THE $^{35}\text{Cl}/^{37}\text{Cl}$ ISOTOPIC RATIO IN DENSE MOLECULAR CLOUDS: HIFI OBSERVATIONS OF HYDROGEN CHLORIDE TOWARDS W3A

JOURNAL: *Astronomy & Astrophysics*, 518, L115 (4 pages), 2010

- 226 AUTHORS:** Cernicharo, J., Waters, L. B. F. M., Decin, L., Encrénaz, P., Tielens, A. G. G. M., Agúndez, M., de Beck, E., Müller, H. S. P., Goicoechea, J. R., Barlow, M. J., Benz, A., Crimier, N., Daniel, F., di Giorgio, A. M., Fich, M., Gaier, T., García-Lario, P., de Koter, A., Khouri, T., Liseau, R., Lombaert, R., Erickson, N., Pardo, J. R., Pearson, J. C., Shipman, R., Sánchez Contreras, C., Teyssier, D.
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JOURNAL: *Astronomy & Astrophysics*, **521**, L115 (4 pages), 2010
- 227 AUTHORS:** Wesson, R., Cernicharo, J., Barlow, M. J., Matsuura, M., Decin, L., Groenewegen, M. A. T., Polehampton, E. T., Agundez, M., Cohen, M., Daniel, F., Exter, K. M., Gear, W. K., Gomez, H. L., Hargrave, P. C., Imhof, P., Ivison, R. J., Leeks, S. J., Lim, T. L., Olofsson, G., Savini, G., Sibthorpe, B., Swinyard, B. M., Ueta, T., Witherick, D. K., Yates, J. A.
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- 230 AUTHORS:** Swinyard, B. M., Hartogh, P., Sidher, S., Fulton, T., Lellouch, E., Jarchow, C., Griffin, M. J., Moreno, R., Sagawa, H., Portyankina, G., Blecka, M., Banaszkiewicz, M., Bockelée-Morvan, D., Crovisier, J., Encrénaz, T., Kueppers, M., Lara, L., Lis, D., Medvedev, A., Renge, M., Szutowicz, S., Vandenbussche, B., Bensch, F., Bergin, E., Billebaud, F., Biver, N., Blake, G., Blommaert, J., de Val-Borro, M., Cernicharo, J., Cavalie, T., Courtin, R., Davis, G., Decin, L., Encrénaz, P., de Graauw, T., Jehin, E., Kidger, M., Leeks, S., Orton, G., Naylor, D., Schieder, R., Stam, D., Thomas, N., Verdugo, E., Waelkens, C., Walker, H.
TITLE: THE HERSCHEL-SPIRE SUBMILLIMETRE SPECTRUM OF MARS
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TITLE: HIFI OBSERVATIONS OF WATER IN THE ATMOSPHERE OF COMET C/2008 Q3

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232 AUTHORS: Bockelée-Morvan, D., Hartogh, P., Crovisier, J., Vandenbussche, B., Swinyard, B. M., Biver, N., Lis, D. C., Jarchow, C., Moreno, R., Hutsemékers, D., Jehin, E., Küppers, M. K., Lara, L. M., Lellouch, E., Manfroid, J., de Val-Borro, M., Szutowicz, S., Banaszkiewicz, M., Bensch, F., Blecka, M. I., Emprechtinger, M., Encrénaz, T., Fulton, T., Kidger, M., Rengel, M., Waelkens, C., Bergin, E., Blake, G. A., Blommaert, J. A. D. L., **Cernicharo, J.**, Decin, L., Encrénaz, P., de Graauw, T., Leeks, S., Medvedev, A. S., Naylor, D., Schieder, R., Thomas, N.

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TITLE: ORIGIN OF THE HOT GAS IN LOW-MASS PROTOSTARS: HERSCHEL-PACS
SPECTROSCOPY OF HH 46

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235 AUTHORS: Nisini, B., Benedettini, M., Codella, C., Giannini, T., Liseau, R., Neufeld, D., Tafalla, M., van Dishoeck, E. F., Bachiller, R., Baudry, A., Benz, O. A., Bergin, E., Bjerkeli, P., Blake, G., Bontemps, S., Braine, J., Bruderer, S., Caselli, P., **Cernicharo, J.**, Daniel, F., Encrénaz, P., di Giorgio, A. M., Dominik, C., Doty, S., Fich, M., Fuente, A., Goicoechea, J. R., de Graauw, Th., Helmich, F., Herczeg, G., Herpin, F., Hogerheijde, M., Jacq, T., Johnstone, D., Jørgensen, J., Kaufman, M., Kirstensen, L., Larsson, B., Lis, D., Marseille, M., McCoey, C., Melnick, G., Olberg, M., Parise, B., Pearson, J., Plume, R., Risacher, C., Santiago, J., Saraceno, P., Shipman, R., van Kempen, T. A., Visser, R., Viti, S., Wampfler, S., Wyrowski, F., van der Tak, F., Yıldız, U. A., Delforge, B., Desbat, J., Hatch, W. A., Peron, I., Schieder, R., Stern, J. A., Teyssier, D., Whyborn, N.

TITLE: WATER COOLING OF SHOCKS IN PROTOSTELLAR OUTFLOWS: HERSCHEL-PACS
MAP OF L1157

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236 AUTHORS: Lefloch, B., Cabrit, S., Codella, C., Melnick, G., **Cernicharo, J.**, Caux, E., Benedettini, M., Boogert, A., Caselli, P., Ceccarelli, C., Gueth, F., Hily-Blant, P., Lorenzani, A., Neufeld, D., Nisini, B., Pacheco, S., Pagani, L., Pardo, J. R., Parise, B., Salez, M., Schuster, K., Viti, S., Bacmann, A., Baudry, A., Bell, T., Bergin, E. A., Blake, G., Bottinelli, S., Castets, A., Comito, C., Coutens, A., Crimier, N., Dominik, C., Demyk, K., Encrénaz, P., Falgarone, E., Fuente, A., Gerin, M., Goldsmith, P., Helmich, F., Hennebelle, P., Henning, T., Herbst, E., Jacq, T., Kahane, C., Kama, M., Klotz, A.,

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TITLE: THE CHESS SPECTRAL SURVEY OF STAR FORMING REGIONS: PEERING INTO THE PROTOSTELLAR SHOCK L1157-B1. II. SHOCK DYNAMICS

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TITLE: DETECTION OF INTERSTELLAR OXIDANIUMYL: ABUNDANT H₂O⁺ TOWARDS THE STAR-FORMING REGIONS DR21, SGR B2, AND NGC6334

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TITLE: CLOUDS, FILAMENTS AND PROTOSTARS: THE HERSCHEL HI-GAL MILKY WAY

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- 240) AUTHORS:** Neufeld, D. A., Sonnentrucker, P., Phillips, T. G., Lis, D. C., De Luca, M., Goicoechea, J. R., Black, J. H., Gerin, M., Bell, T., Boulanger, F., **Cernicharo, J.**, Coutens, A., Dartois, E., Kazmierczak, M., Encrénaz, P., Falgarone, E., Geballe, T. R., Giesen, T., Godard, B., Goldsmith, P. F., Gry, C., Gupta, H., Hennebelle, P., Herbst, E., Hily-Blant, P., Joblin, C., Kolos, R., Krelowski, J., Martin-Pintado, J., Menten, K. M., Monje, R., Mookerjea, B., Pearson, J., Perault, M., Persson, C., Plume, R., Salez, M., Schlemmer, S., Schmidt, M., Stutzki, J., Teyssier, D., Vastel, C., Yu, S., Cais, P., Caux, E., Liseau, R., Morris, P., Planesas, P.

TITLE: STRONG ABSORPTION BY INTERSTELLAR HYDROGEN FLUORIDE:

HERSCHEL/HIFI OBSERVATIONS OF THE SIGHT-LINE TO G10.6-0.4 (W31C)

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- 241) AUTHORS:** Phillips, T. G., Bergin, E. A., Lis, D. C., Neufeld, D. A., Bell, T. A., Wang, S., Crockett, N. R., Emprechtinger, M., Blake, G. A., Caux, E., Ceccarelli, C., Cernicharo, J., Comito, C., Daniel, F., Dubernet, M.-L., Encrénaz, P., Gerin, M., Giesen, T. F., Goicoechea, J. R., Goldsmith, P. F., Herbst, E., Joblin, C., Johnstone, D., Langer, W. D., Latter, W. D., Lord, S. D., Maret, S., Martin, P. G., Melnick, G. J., Menten, K. M., Morris, P., Müller, H. S. P., Murphy, J. A., Ossenkopf, V., Pearson, J. C., Péault, M., Plume, R., Qin, S.-L., Schilke, P., Schlemmer, S., Stutzki, J., Trapé, N., van der Tak, F. F. S., Vastel, C., Yorke, H. W., Yu, S., Zmuidzinas, J., Boogert, A., Güsten, R., Hartogh, P., Honingh, N., Karpov, A., Kooi, J., Krieg, J.-M., Schieder, R.
- TITLE:** HERSCHEL OBSERVATIONS OF EXTRA-ORDINARY SOURCES (HEXOS): DETECTION OF HYDROGEN FLUORIDE IN ABSORPTION TOWARDS ORION KL
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- 243) AUTHORS:** van der Tak, F. F. S., Marseille, M. G., Herpin, F., Wyrowski, F., Baudry, A., Bontemps, S., Braine, J., Doty, S., Frieswijk, W., Melnick, G., Shipman, R., van Dishoeck, E. F., Benz, A. O., Caselli, P., Hogerheijde, M., Johnstone, D., Liseau, R., Bachiller, R., Benedettini, M., Bergin, E., Bjerkeli, P., Blake, G., Bruderer, S., **Cernicharo, J.**, Codella, C., Daniel, F., di Giorgio, A. M., Dominik, C., Encrénaz, P., Fich, M., Fuente, A., Giannini, T., Goicoechea, J., de Graauw, Th., Helmich, F., Herczeg, G., Jørgensen, J., Kristensen, L., Larsson, B., Lis, D., McCoey, C., Neufeld, D., Nisini, B., Olberg, M., Parise, B., Pearson, J., Plume, R., Risacher, C., Santiago, J., Saraceno, P., Tafalla, M., van Kempen, T., Visser, R., Wampfler, S., Yıldız, U., Ravera, L., Roelfsema, P., Siebertz, O., Teyssier, D.

TITLE: WATER ABUNDANCE VARIATIONS AROUND HIGH-MASS PROTOSTARS: HIFI OBSERVATIONS OF THE DR21 REGION

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- 244) AUTHORS:** Fich, M., Johnstone, D., van Kempen, T. A., McCoey, C., Fuente, A., Caselli, P., Kristensen, L. E., Plume, R., **Cernicharo, J.**, Herczeg, G. J., van Dishoeck, E. F., Wampfler, S., Gaufre, P., Gill, J. J., Javadi, H., Justen, M., Laauwen, W., Luinge, W., Ossenkopf, V., Pearson, J., Bachiller, R., Baudry, A., Benedettini, M., Bergin, E., Benz, A. O., Bjerkeli, P., Blake, G., Bontemps, S.,

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- 245 AUTHORS:** Bujarrabal, V., Alcolea, J., Soria-Ruiz, R., Planesas, P., Teyssier, D., Marston, A. P., **Cernicharo, J.**, Decin, L., Dominik, C., Justtanont, K., de Koter, A., Melnick, G., Menten, K. M., Neufeld, D. A., Olofsson, H., Schmidt, M., Schöier, F. L., Szczerba, R., Waters, L. B. F. M., Quintana-Lacaci, G., Güsten, R., Gallego, J. D., Díez-González, M. C., Barcia, A., López-Fernández, I., Wildeman, K., Tielens, A. G. G. M., Jacobs, K.

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TITLE: A HIFI PREVIEW OF WARM MOLECULAR GAS AROUND X CYGNI: FIRST DETECTION OF H₂O EMISSION TOWARD AN S-TYPE AGB STAR

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TITLE: HERSCHEL/HIFI OBSERVATIONS OF INTERSTELLAR OH⁺ AND H₂O⁺ TOWARDS W49N: A PROBE OF DIFFUSE CLOUDS WITH A SMALL MOLECULAR FRACTION

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TITLE: HERSCHEL OBSERVATIONS OF ORTHO- AND PARA-OXIDANIUMYL (H₂O⁺) IN SPIRAL ARM CLOUDS TOWARD SAGITTARIUS B2(M)

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TITLE: DETECTION OF HYDROGEN FLUORIDE ABSORPTION IN DIFFUSE MOLECULAR CLOUDS WITH HERSCHEL/HIFI: AN UBIQUITOUS TRACER OF MOLECULAR GAS

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TITLE: EXCITATION AND ABUNDANCE OF C₃ IN STAR FORMING CORES. HERSCHEL/HIFI

OBSERVATIONS OF THE SIGHT-LINES TO W31C AND W49N

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TITLE: HERSCHEL OBSERVATIONS OF EXTRA-ORDINARY SOURCES (HEXOS): DETECTING SPIRAL ARM CLOUDS BY CH ABSORPTION LINES

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TITLE: CH⁺(1-0) AND ¹³CH⁺(1-0) ABSORPTION LINES IN THE DIRECTION OF MASSIVE STAR-FORMING REGIONS

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TITLE: INTERSTELLAR CH ABSORPTION IN THE DIFFUSE INTERSTELLAR MEDIUM ALONG THE SIGHT-LINES TO G10.6-0.4 (W31C), W49N, AND W51

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TITLE: HERSCHEL OBSERVATIONS OF EXTRA-ORDINARY SOURCES (HEXOS): THE PRESENT AND FUTURE OF SPECTRAL SURVEYS WITH HERSCHEL/HIFI

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TITLE: HERSCHEL OBSERVATIONS OF EXTRA-ORDINARY SOURCES (HEXOS): OBSERVATIONS OF H₂O AND ITS ISOTOPES TOWARDS ORION KL

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TITLE: WATER VAPOR TOWARD STARLESS CORES: THE HERSCHEL VIEW

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TITLE: WATER IN LOW-MASS STAR-FORMING REGIONS WITH HERSCHEL . HIFI SPECTROSCOPY OF NGC 1333

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TITLE: ORTHO-TO-PARA RATIO OF INTERSTELLAR HEAVY WATER

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- TITLE:** WATER ABUNDANCES IN HIGH-MASS PROTOSTELLAR ENVELOPES: HERSCHEL OBSERVATIONS WITH HIFI
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- TITLE:** VARIATIONS IN $\text{H}_2\text{O}^+/\text{H}_2\text{O}$ RATIOS TOWARD MASSIVE STAR-FORMING REGIONS
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TITLE: HYDRIDES IN YOUNG STELLAR OBJECTS: RADIATION TRACERS IN A PROTOSTAR-DISK-OUTFLOW SYSTEM

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TITLE: HERSCHEL OBSERVATIONS OF THE HYDROXYL RADICAL (OH) IN YOUNG STELLAR OBJECTS

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TITLE: WATER IN MASSIVE STAR-FORMING REGIONS: HIFI OBSERVATIONS OF W3 IRS5

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TITLE: HERSCHEL OBSERVATIONS OF DEUTERATED WATER TOWARDS SGR B2(M)

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TITLE: THE METHANOL LINES AND HOT CORE OF OMC2-FIR4, AN INTERMEDIATE-MASS PROTOSTAR, WITH HERSCHEL/HIFI

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TITLE: HERSCHEL/HIFI OBSERVATIONS OF HIGH-J CO LINES IN THE NGC 1333 LOW-MASS STAR-FORMING REGION

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TITLE: HERSCHEL/HIFI SPECTROSCOPY OF THE INTERMEDIATE MASS PROTOSTAR NGC 7129 FIRS 2

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TITLE: FIRST DETECTION OF ND IN THE SOLAR-MASS PROTOSTAR IRAS16293-2422

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TITLE: HERSCHEL/HIFI OBSERVATIONS OF SPECTRALLY RESOLVED METHYLIDYNE SIGNATURES TOWARD THE HIGH-MASS STAR-FORMING CORE NGC 6334I

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TITLE: SILICON AND HYDROGEN CHEMISTRY UNDER LABORATORY CONDITIONS MIMICKING THE ATMOSPHERE OF EVOLVED STARS
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TITLE: COMPREHENSIVE ROTATIONAL STUDY AND ASTRONOMICAL SEARCH FOR CYCLOPROPANECARBOXALDEHYDE
JOURNAL: *Astronomy & Astrophysics*, 645, A75, DOI : 10.1051/0004-6361/202039924, 2021
- 534) AUTHORS:** Cernicharo J., Cabezas C., Endo, Y., Agúndez M., Tercero B., Pardo J.R., Marcelino N., de Vicente P.
TITLE: THE SULPHUR SAGA IN TMC-1: DISCOVERY OF HCSCN AND HCSCCH
JOURNAL: *Astronomy & Astrophysics*, 650, L14, DOI : 10.1051/0004-6361/202141297, 2021
- 535) AUTHORS:** Cabezas, C., Roueff, E., Tercero, B., Agúndez M., Marcelino N., de Vicente P., **Cernicharo J.**
TITLE: DETECTION OF DEUTERATED METHYLCYANOACETYLENE, CH₂DC₃N, IN TMC-1
JOURNAL: *Astronomy & Astrophysics*, 650, L15, DOI : 10.1051/0004-6361/202141371, 2021
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TITLE: INTERSTELLAR DETECTION OF THE SIMPLEST AMINOCARBYPNE, H₂NC: AN IGNORED BUT ABUNDANT MOLECULE
JOURNAL: *Astronomy & Astrophysics*, 654, A45, DOI: 10.1051/0004-6361/202141491 , 2021

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TITLE: DISCOVERY OF BENZYNE, o-C₆H₄, IN TMC-1 WITH THE QUIJOTE LINE SURVEY
JOURNAL: *Astronomy & Astrophysics*, 652, L9, DOI: 10.1051/0004-6361/202141660 , 2021
- 539) AUTHORS:** Pardo, J.R., Cabezas, C., Fonfría, J.P., Agúndez, M., C., Tercero, B., de Vicente, P., Guélin, M., Cernicharo, J.
TITLE: MAGNESIUM RADICALS MgC₅N AND MgC₆H IN IRC +10216
JOURNAL: *Astronomy & Astrophysics*, 652, L13, DOI: 10.1051/0004-6361/202141671, 2021
- 540) AUTHORS:** Cabezas, C., Agúndez, M., Marcelino, N., Tercero, B., Pardo, J.R., de Vicente, P., Cernicharo, J.
TITLE: DISCOVERY OF INTERSTELLAR 3-CYANO PROPARGYL RADICAL, CH₂CCCN
JOURNAL: *Astronomy & Astrophysics*, 654, L9, DOI: 10.1051/0004-6361/202142156, 2021
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TITLE: DISCOVERY OF HCCCO AND C₅O IN TMC-1 WITH THE QUIJOTE LINE SURVEY
JOURNAL: *Astronomy & Astrophysics*, 656, L21, DOI: 10.1051/0004-6361/202142634, 2021
- 542) AUTHORS:** Cernicharo, J., Agúndez, M., Kaiser, R.I., Cabezas, C., Tercero, B., Marcelino, N., Pardo, J.R., de Vicente
TITLE: DISCOVERY OF TWO ISOMERS OF ETHYNYL CYCLOPENTADIENE IN TMC-1: ABUNDANCES OF CCH AND CN DERIVATIVES OF HYDROCARBON CYCLES
JOURNAL: *Astronomy & Astrophysics*, 655, L1, DOI: 10.1051/0004-6361/202142226, 2021
- 543) AUTHORS:** Martínez, Lidia; Merino, Pablo ; Santoro, Gonzalo; Martínez, José I. ; Katsanoulis, Stergios; Ault, Jesse; Mayoral, Álvaro; Vázquez, Luis; Accolla, Mario; Dazzi, Alexandre; Mathurin, Jeremie; Borondics, Ferenc; Blázquez-Blázquez, Enrique; Shauloff, Nitzan; Lebrón-Aguilar, Rosa; Quintanilla-López, Jesús E.; Jelinek, Raz; Cernicharo, José; Stone, Howard A.; de la Peña O'Shea, Victor A.; de Andres, Pedro L.; Haller, George; Ellis, Gary J.; Martín-Gago, José A.
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TITLE: SUBMILLIMETER WAVE SPECTROSCOPY OF PROPANOIC ACID (CH₃CH₂COOH) AND ITS ISM SEARCH
JOURNAL: *Journal of Molecular Spectroscopy*, 379, 111454, DOI: 10.1016/j.jms.2021.111454, 2021
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TITLE: LABORATORY OBSERVATION OF, ASTROCHEMICAL SEARCH FOR, AND STRUCTURE OF ELUSIVE ERYTHRULOSE IN THE INTERSTELLAR MEDIUM
JOURNAL: *The Journal of Physical Chemistry Letters*, 12, 4, DOI: 10.1021/acs.jpclett.0c03050, 2021

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TITLE: LABORATORY OBSERVATION AND ASTRONOMICAL SEARCH OF 1-CYANO PROPARGYL RADICAL, HCCCHCN
JOURNAL: *Astronomy and Astrophysics*, 657, A24, DOI: 10.1051/0004-6361/202142188, 2022
SUPPLEMENTARY INFORMATION: VizieR On-line Data Catalog: 2021yCat..36570024C

- 547) AUTHORS:** Agúndez, M.; Marcelino, N; Cabezas, C.; Fuentetaja, R.; Tercero, B.; de Vicente, P., **Cernicharo, J.**
TITLE: DETECTION OF THE PROPARGYL RADICAL AT Λ 3 MM
JOURNAL: *Astronomy and Astrophysics*, 657, A96, DOI: 10.1051/0004-6361/202142678, 2022
- 548) AUTHORS:** Cabezas, C.; Agúndez, M.; Marcelino, N.; Tercero, B.; Endo, Y.; Fuentetaja, R.; Pardo, J. R.; de Vicente, P.; **Cernicharo, J.**
TITLE: DISCOVERY OF THE ELUSIVE THIOKETENIUM, HCCS⁺, IN TMC-1
JOURNAL: *Astronomy and Astrophysics*, 657, L4, DOI: 10.1051/0004-6361/202142815, 2022
- 549) AUTHORS:** Cabezas, C.; Fuentetaja. R.; Roueff, E.; Agúndez, M.; Tercero, B.; Marcelino, N.; Pardo, J. R.; de Vicente, P.; **Cernicharo, J.**
TITLE: NEW DEUTERATED SPECIES IN TMC-1: DETECTION OF CH₂DC₄H WITH THE QUIJOTE LINE SURVEY
JOURNAL: *Astronomy and Astrophysics*, 657, L5, DOI: 10.1051/0004-6361/202142814, 2022
- 550) AUTHORS:** **Cernicharo, J.**; Agúndez, M., Cabezas, C.; Fuentetaja. R.; Tercero, B.; Marcelino, N.; Endo, Y; Pardo, J. R.; de Vicente, P.
TITLE: DISCOVERY OF C₅H⁺ AND DETECTION OF C₃H⁺ IN TMC-1 WITH THE QUIJOTE LINE SURVEY
JOURNAL: *Astronomy and Astrophysics*, 657, L16, DOI: 10.1051/0004-6361/202142992, 2022
- 551) AUTHORS:** Pardo, J. R.; **Cernicharo, J.**; Tercero, B.; Cabezas, C.; Bermúdez, C.; Agúndez, M.; Gallego, J. D.; Tercero, F.; Gómez-Garrido, M.; de Vicente, P.; López-Pérez, J. A.
TITLE: ULTRA-DEEP 31.0-50.3 GHZ SPECTRAL SURVEY OF IRC+10216
JOURNAL: *Astronomy and Astrophysics*, 658, A39, DOI: 10.1051/0004-6361/202142263, 2022
SUPPLEMENTARY INFORMATION: VizieR On-line Data Catalog: 2021yCat..36580039P
- 552) AUTHORS:** Reach, William T.; Ruaud, Maxime; Wiesemeyer, Helmut; Riquelme, Denise; Tram, Le Ngoc; **Cernicharo, Jose**; Smith, Nathan; Chambers, Edward T.
TITLE: IONIZED CARBON AROUND IRC+10216
JOURNAL: *The Astrophysical Journal*, 926, 69, DOI: 10.3847/1538-4357/ac4162, 2022
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TITLE: DISCOVERY OF A NEW MOLECULAR ION, HC₇NH⁺, IN TMC-1
JOURNAL: *Astronomy and Astrophysics*, 659, L8, DOI: 10.1051/0004-6361/202142972, 2022
- 554) AUTHORS:** Agúndez, M.; Cabezas, C.; Marcelino, N.; Fuentetaja, R.; Tercero, B., de Vicente, P.; **Cernicharo, J.**
TITLE: A NEW PROTONATED MOLECULE DISCOVERED IN TMC-1: HCCNCH⁺
JOURNAL: *Astronomy and Astrophysics*, 659, L9, DOI: 10.1051/0004-6361/202243396, 2022
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TITLE: DETECTION OF THE S(1) ROTATIONAL LINE OF H₂ TOWARD IRC+10216: A SIMULTANEOUS MEASUREMENT OF THE MASS-LOSS RATE AND CO ABUNDANCE
JOURNAL: *The Astrophysical Journal Letters*, 927, L33, DOI: 10.3847/2041-8213/ac5a58, 2022
- 556) AUTHORS:** Cabezas, Carlos; Peña, Isabel; Saragi, Rizalina T.; Juanes, Marcos; Lesarri, Alberto; **Cernicharo, José**
TITLE: ROTATIONAL SPECTROSCOPY OF THE LARGE SATURATED DINITRILES HEXANEDINITRILE AND HEPTANEDINITRILE
JOURNAL: *Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy*, Volume 270, 120844., DOI: 10.1016/j.saa.2021.120844, 2022
- 557) AUTHORS:** Guélin, M., **Cernicharo, José**
TITLE: ORGANIC MOLECULES IN INTERSTELLAR SPACE: LATEST ADVANCES

JOURNAL: Frontiers in Astronomy and Space Sciences, vol. 9, id. 787567, *DOI*: 10.3389/fspas.2022.787567, 2022

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TITLE: A NEW PROTONATED MOLECULE DISCOVERED IN TMC-1: HCCNCH⁺
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- 559 AUTHORS:** Cabezas, C., Agúndez, M., Fuentetaja, R., Endo, Y., Marcelino, N., Tercero, B., de Vicente, P., **Cernicharo, José**
TITLE: DISCOVERY OF THE CYCLIC C₅H RADICAL IN TMC-1
JOURNAL: Astronomy and Astrophysics, 659, L9, 2022
- 560 AUTHORS:** Fuentetaja, R., Cabezas, C., Agúndez, M., Tercero, B., Marcelino, N., Pardo, J.R., de Vicente, P., **Cernicharo, José**
TITLE: DISCOVERY OF CH₂CCHC₄H AND A RIGOROUS DETECTION OF CH₂CCHC₃N IN TMC-1 WITH THE QUIJOTE LINE SURVEY
JOURNAL: Astronomy and Astrophysics, 663, L3, 2022. *DOI*: 10.1051/0004-6361/202243857
- 561 AUTHORS:** **Cernicharo, José**, Fuentetaja, R., Cabezas, C., Agúndez, M., Marcelino, N., Tercero, B., Pardo, J.R., de Vicente, P.
TITLE: DISCOVERY OF FIVE CYANO DERIVATIVES OF PROPENE WITH THE QUIJOTE LINE SURVEY
JOURNAL: Astronomy and Astrophysics, 663, L5, 2022. *DOI*: 10.1051/0004-6361/202244255
- 562 AUTHORS:** **Cernicharo, José**, Fuentetaja, R., Agúndez, M., Cabezas, C., Marcelino, N., Tercero, B., Pardo, J.R., de Vicente, P.
TITLE: DISCOVERY OF FULVENALLENE IN TMC-1 WITH THE QUIJOTE LINE SURVEY
JOURNAL: Astronomy and Astrophysics, 663, L9, 2022. *DOI*: 10.1051/0004-6361/202244399
- 563 AUTHORS:** Pardo, J.R., De Breuck, C., Muders, D., González, J., Montenegro-Montes, F.M., Pérez-Beaupuits, J.P., **Cernicharo, José**, Prigent, C., Serabyn, E., Mroczkowski, T., Phillips, N.
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JOURNAL: Astronomy and Astrophysics, 664, A153, 2022. *DOI*: 10.1051/0004-6361/202243409
- 564 AUTHORS:** Changala, P.B., Gupta, H., **Cernicharo, José**, Pardo, J.R., Agúndez, M., Cabezas, C., Tercero, B., Guélin, M., McCarthy, M.C.
TITLE: LABORATORY AND ASTRONOMICAL DISCOVERY OF MAGNESIUM DICARBIDE, MgC₂
JOURNAL: Astrophysical Journal, *in press*, 2022. arXiv:2210.17348
- 565 AUTHORS:** Fuentetaja, R., Agúndez, M., Cabezas, C., Tercero, B., Marcelino, N., Pardo, J.R., de Vicente, P., **Cernicharo, José**
TITLE: DISCOVERY OF TWO NEW INTERSTELLAR MOLECULES WITH QUIJOTE: HCCCHCCC AND HCCCCS
JOURNAL: Astronomy and Astrophysics, 667, L4, 2022. *DOI*: 10.1051/0004-6361/202245018
- 566 AUTHORS:** Olivier Berné, Émilie Habart, Els Peeters, Alain Abergel, Edwin A. Bergin, Jeronimo Bernard-Salas, Emeric Bron, Jan Cami, Emmanuel Dartois, Asunción Fuente, Javier R. Goicoechea, Karl D. Gordon, Yoko Okada, Takashi Onaka, Massimo Robberto, Markus Röllig, Alexander G. G. M. Tielens, Sílvia Vicente, Mark G. Wolfire, Extended Core Team:, Felipe Alarcón, C. Boersma, Amélie Canin, Ryan Chown, Daniel Dicken, David Languignon, Romane Le Gal, Marc W. Pound, Boris Trahin, Thomas Simmer, Ameek Sidhu, Dries Van De Putte, One-time co-authors contributed to SEPs, Sara Cuadrado, Claire Guilloteau, Alexandros Maragkoudakis, Bethany R. Schefter, Thiébaut Schirmer, Collaborators:, Stéphanie Cazaux, Isabel Aleman, Louis Allamandola, Rebecca Auchettl, Giuseppe Antonio Baratta, Salma Bejaoui, Partha P. Bera, Goranka Bilalbegović, John H. Black, Francois Boulanger, Jordy Bouwman,

Bernhard Brandl, Philippe Brechignac, Sandra Brünken, Andrew Burkhardt, Alessandra Candian, **José Cernicharo**, Marin Chabot, Shubhadip Chakraborty, Jason Champion, Sean W. J. Colgan, Ilsa R. Cooke, Audrey Coutens, Nick L. J. Cox, Karine Demyk, Jennifer Donovan Meyer, Cécile Engrand, Sacha Foschino, Pedro García-Lario, Lisseth Gavilan, Maryvonne Gerin, Marie Godard, Carl A. Gottlieb, Pierre Guillard, Antoine Gusdorf, Patrick Hartigan, Jinhua He, Eric Herbst, Liv Hornekaer, Cornelia Jäger, Eduardo Janot-Pacheco, Christine Joblin, Michael Kaufman, Francisca Kemper, Sarah Kendrew, Maria S. Kirsanova, Pamela Klaassen, Collin Knight, Sun Kwok, Álvaro Labiano, Thomas S.-Y. Lai, Timothy J. Lee, Bertrand Lefloch, Franck Le Petit, Aigen Li, Hendrik Linz, Cameron J. Mackie, Suzanne C. Madden, Joëlle Mascetti, Brett A. McGuire, Pablo Merino, Elisabetta R. Micelotta, Karl Misselt, Jon A. Morse, Giacomo Mulas, Naslim Neelamkodan, Ryou Ohsawa, Alain Omont, Roberta Paladini, Maria Elisabetta Palumbo, Amit Pathak, Yvonne J. Pendleton, Annemieke Petrignani, Thomas Pino, Elena Puga, Naseem Rangwala, Mathias Rapacioli, Alessandra Ricca, Julia Roman-Duval, Joseph Roser, Evelyne Roueff, Gaël Rouillé, Farid Salama, Dinalva A. Sales, Karin Sandstrom, Peter Sarre, Ella Sciamma-O'Brien, Kris Sellgren, Matthew J. Shannon, Sachindev S. Shenoy, David Teyssier, Richard D. Thomas, Aditya Togi, Laurent Verstraete, Adolf N. Witt, Alwyn Wootten, Nathalie Ysard, Henning Zettergren, Yong Zhang, Ziwei E. Zhang, and Junfeng Zhen

TITLE: PDRS4ALL: A JWST EARLY RELEASE SCIENCE PROGRAM ON RADIATIVE FEEDBACK FROM MASSIVE STARS

JOURNAL: Publications of the Astronomical Society of the Pacific, 134, 054301, 2022. **DOI:** 10.1088/1538-3873/ac604c

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567) **AUTHORS:** Quintana-Lacaci, G., Velilla-Prieto, L., Agúndez, M., Fonfría, J.P., **Cernicharo, J.**, Decin, L., Castro-Carrizo, A.

TITLE: HISTORY OF TWO MASS LOSS PROCESSES IN VY CMA. FAST OUTFLOWS CARVING OLDER EJECTA

JOURNAL: Astronomy and Astrophysics, 669, A56, 2023. **DOI:** 10.1051/0004-6361/202244396

568) **AUTHORS:** Agúndez, M., Cabezas, C., Marcelino, N., Fuentetaja, R., Tercero, B., deVicente P., **Cernicharo, J.**

TITLE: DISCOVERY OF INTERSTELLAR NC₄NH⁺: DICYANOPOLYYNES ARE INDEED ABUNDANT IN SPACE

JOURNAL: Astronomy and Astrophysics, 669, L1, 2023. **DOI:** 10.1051/0004-6361/202245492

569) **AUTHORS:** **Cernicharo, J.**, Pardo, J.R., Cabezas, C., Agúndez, M., Tercero, B., Marcelino, N., Fuentetaja, R., deVicente P., Guélin, M.

TITLE: DISCOVERY OF THE C₇N⁻ ANION IN TMC-1 AND IRC +10216

JOURNAL: Astronomy and Astrophysics, 670, L19, 2023. **DOI:** 10.1051/0004-6361/202245816

570) **AUTHORS:** Cabezas, C., Peña, I., **Cernicharo, J.**

TITLE: LABORATORY ROTATIONAL SPECTROSCOPY AND ASTRONOMICAL SEARCH OF ETHYNYL SUBSTITUTED NAPHTHALENE

JOURNAL: MNRAS, 519, 2590, 2023. **DOI:** 10.1093/mnras/stac3698

571) **AUTHORS:** Fuentetaja, R., Bermúdez, C., Cabezas, Agúndez, M., Tercero, B., Marcelino, N., Pardo, J.R., Margùles, L., Motiyenko, R.A., Guillemin, J.C., deVicente, P., **Cernicharo, J.**

TITLE: DISCOVERY OF CH₃CHCO IN TMC-1 WITH THE QUIJOTE LINE SURVEY

JOURNAL: Astronomy and Astrophysics, 671, L6, 2023. **DOI:** 10.1051/0004-6361/202245732

572) **AUTHORS:** Fuentetaja, R., Bermúdez, C., Cabezas, Agúndez, M., Tercero, B., Marcelino, N., Pardo, J.R., Margùles, L., Motiyenko, R.A., Guillemin, J.C., deVicente, P., **Cernicharo, J.**

TITLE: ELUCIDATING THE FORMATION OF ETHYNYLBUTATRIENYLIDENE (HCCCH₃CC; X¹A') IN THE TAURUS MOLECULAR CLOUD (TMC-1) VIA THE GAS-PHASE REACTION OF TRICARBON (C₃) WITH THE PROPARGYL RADICAL (C₃H₃)

JOURNAL: Astrophysical Journal, 945, L40, 2023. DOI: 10.3847/2041-8213/acbf41

573) AUTHORS: Cabezas, C., Kawashima, Y., Bermúdez, C., Usami, T., Hirota, E., **Cernicharo, J.**

TITLE: THE CONFORMATIONAL BEHAVIOR OF N-ETHYLFORMAMIDE AS OBSERVED BY ROTATIONAL SPECTROSCOPY AND QUANTUM CHEMISTRY

JOURNAL: Spectrochimica Acta Part A: Molecular and Biomolecular, 291, 122353, 2023. DOI: 10.1016/j.saa.2023.122353

574) AUTHORS: Agúndez, M., Roncero, O., Marcelino, N., Cabezas, C., Tercero, B., **Cernicharo, J.**

TITLE: THE CHEMISTRY OF H₂NC IN THE INTERSTELLAR MEDIUM AND THE ROLE OF THE C + NH₃ REACTION

JOURNAL: Astronomy and Astrophysics, *in press*, 2023. DOI: 10.48550/arXiv.2303.12011

575) AUTHORS: Agúndez, M., Loison, J.C., Hickson, K.M., Wakelam, V., Fuentetaja, R., Cabezas, C., Marcelino, N., Tercero, B., de Vicente, P., **Cernicharo, J.**

TITLE: DETECTION OF ETHANOL, ACETONE, AND PROPANAL IN TMC-1: NEW O-BEARING COMPLEX ORGANICS IN COLD SOURCES

JOURNAL: Astronomy and Astrophysics, *in press*, 2023. DOI: 10.48550/arXiv.2303.16121

576) AUTHORS: Cabezas, C., Pardo, J.R., Agúndez, M., Tercero, B., Marcelino, N., Endo, Y., de Vicente, P., Guélin, M., **Cernicharo, J.**

TITLE: DISCOVERY OF TWO METALLIC CYANOACETYLIDES IN IRC+10216: HMgCCN AND NaCCCN

JOURNAL: Astronomy and Astrophysics, *in press*, 2023. DOI: 10.48550/arXiv.2304.01066

577) AUTHORS: **Cernicharo, J.**, Cabezas, C., Pardo, J.R., Agúndez, M., Roncero, O., Tercero, B., Marcelino, N., Guélin, M., Endo, Y., de Vicente, P.

TITLE: THE MAGNESIUM PARADIGM IN IRC+10216: DISCOVERY OF MgC₄H⁺, MgC₃N⁺, MgC₆H⁺, AND MgC₅N⁺

JOURNAL: Astronomy and Astrophysics, *in press*, 2023. DOI: 10.48550/arXiv.2304.05117

ANNEX II

PUBLICATIONS IN INTERNATIONAL CONFERENCES

- 1) **AUTHORS:** U. Mebold, L. Velden, C. Crezelius, K. Reif, **J. Cernicharo**
TITLE: MOLECULAR CLOUDS AT HIGH GALACTIC LATITUDES
CONFERENCE/JOURNAL: *Astronomische Gesellschaft, Wissenschaftliche Astronomische Tagung, Kiel, West Germany, Sept. 26-30, 1983) Astronomische Gesellschaft, Mitteilungen, no. 60, 1983, p. 418-422. In German. Sponsorship: Deutsche Forschungsgemeinschaft.*
- 2) **AUTHORS:** G. Duvert, **J. Cernicharo**, A. Baudry
TITLE: A MOLECULAR SURVEY OF THREE DARK CLOUDS IN TAURUS
CONFERENCE/JOURNAL: *CONFERENCE/JOURNAL des Astronomes Francais, vol. 25, pag. 19, 1985.*
- 3) **AUTHORS:** R. Bachiller, **J. Cernicharo**, J. Martín-Pintado.
TITLE: OBSERVATIONS OF YOUNG COMETARY NEBULA WITH THE IRAM 30-M RADIOTELESCOPE : THE CASE OF R MON.
CONFERENCE/JOURNAL: European Regional Astronomy Meeting of the IAU, 10th, Prague, Czechoslovakia, Aug. 24-29, 1987, Proceedings. Volume 4 (A89-32590 13-90). Ondrejov, Czechoslovakia, Czechoslovak Academy of Sciences, **1987**, p. 29-32.
- 4) **AUTHORS:** M. Guélin, **J. Cernicharo**
TITLE: MASS DISTRIBUTION IN THE TAURUS COMPLEX (**invited talk**).
CONFERENCE/JOURNAL: *Molecular Clouds in the Milky Way and External Galaxies. 1988, 81-90, Reidel.*
- 5) **AUTHORS:** M. Guélin, **J. Cernicharo**
TITLE: MOLECULAR ABUNDANCES IN THE DENSE INTERSTELLAR AND CIRCUMSTELLAR CLOUDS (**invited talk**).
CONFERENCE/JOURNAL: *Physics and Chemistry of Interestellar Molecular Clouds : mm and sub-mm observations in Astrophysics. 1989, 337-343.*
- 6) **AUTHORS:** M. Guélin, S. García-Burillo, R. Blundell, **J. Cernicharo**, D. Despois, H. Steppe
TITLE: THE MOLECULAR SPIRAL STRUCTURE IN M51 DERIVED FROM CO(J=2-1) LINE OBSERVATIONS.
CONFERENCE/JOURNAL: *IAU Highlights of Astronomy, vol 8, page 575-577, 1989*, edited by D.McNally, Kluwer Academic Publishers.
- 7) **AUTHORS:** A. Omont, S. Guilloteau, R. Lucas, J.J. Benayoun, **J. Cernicharo**, E. Nercessian, M. Jura, M. Morris, P.F. Goldsmith, D.C. Lis, Nguyen-Q-Rieu.
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- 184) **AUTHORS:** Cernicharo, J.
TITLE: SYNERGIES BETWEEN ALMA HIGH ANGULAR RESOLUTION OBSERVATIONS AND SUBMILLIMETER AND FAR-IR DATA FROM HERSCHEL ARCHIVE
CONFERENCE/JOURNAL: ALMA/Herschel Archival Workshop 2015 (ESO, Garching, Germany, 15-17 Abril, 2015)
- 185) **AUTHORS:** Cernicharo, J.
TITLE: THE SYNERGY BETWEEN LABORATORY, THEORY AND ASTROPHYSICAL OBSERVATIONS IN THE ALMA/HERSCHEL ERA
CONFERENCE/JOURNAL: AMOC 2015 - Anharmonicity in medium-sized molecules and clusters (Madrid, Spain, 26 – 30 Abril 2015)
- 186) **AUTHORS:** Cernicharo, J.
TITLE: THE ALMA VIEW OF IRC+10216: FROM THE EXTERNAL LAYERS TO THE DUST FORMATION ZONE
CONFERENCE/JOURNAL: Workshop on “High-Resolution Submillimeter Spectroscopy of the Interstellar Medium and Star Forming Regions — From Herschel to ALMA and Beyond” (Zakopane, Poland, 12-16 Mayo, 2015)
- 187) **AUTHORS:** Cernicharo, J.
TITLE: MEDIO CIRCUNESTELAR E INTERESTELAR
CONFERENCE/JOURNAL: Red de infraestructuras de Astronomía – RIA: Amazing science with CARMENES (Granada, Spain, 21 – 22 Mayo, 2015)
- 188) **AUTHORS:** Cernicharo, J.
TITLE: CARBON CHEMISTRY IN AGB STARS
CONFERENCE/JOURNAL: European Week of Astronomy and Space Science (EWASS 2015, La Laguna, Tenerife, Canary Islands, Spain, 22 – 26 Junio, 2015)
- 189) **AUTHORS:** Agúndez, M., Cernicharo, J., Guélin, M.
TITLE: THE CHEMISTRY OF MOLECULAR ANIONS IN CIRCUMSTELLAR SOURCES
CONFERENCE/JOURNAL: AIP Conference Proceedings, 1642, 362-365, 2015
- 190) **AUTHORS:** Cernicharo, J.
TITLE: CARBON BEARING MOLECULES IN EVOLVED STARS
CONFERENCE/JOURNAL: 25th International Symposium on Polycyclic Aromatic Compounds (ISPAC 2015, Bordeaux, France, 13 – 17 Septiembre, 2015)
- 191) **AUTHORS:** Cernicharo, J.
TITLE: THE ALMA VIEW OF IRC+10216
CONFERENCE/JOURNAL: 11th Pacific Rim Conference on Stellar Astrophysics (Hong Kong, China, 14-17 Diciembre, 2015)
- 192) **AUTHORS:** Cernicharo, J.
TITLE: THE SEARCH FOR NEW MOLECULAR SPECIES IN THE ISM, ISOTOPOLOGUES AND VIBRATIONALLY EXCITED STATES
CONFERENCE/JOURNAL: 1st Annual Meeting of the WG1/WG4 COST Action 1401: Our Astrochemical History (7 – 8 Marzo, 2016, Pisa, Italy)
- 193) **AUTHORS:** Cernicharo, J.
TITLE: THE MADEX CODE AND THE QUEST FOR NEW MOLECULAR SPECIES
CONFERENCE/JOURNAL: 1st Italian Workshop on Astrochemistry: Astronomical Complex Organic Molecules in different environments (10 – 11 Marzo, 2016, Florencia, Italy)
- 194) AUTHORS: Cernicharo, J.
TITLE: MOLECULAR SPECTROSCOPY IN SPACE: DISCOVERING NEW MOLECULES FROM LINE SURVEYS AND LABORATORY SPECTROSCOPY
CONFERENCE/JOURNAL: 71st International Meeting on Molecular Spectroscopy (20-24 Junio, 2016, Champaign-Urbana, USA)
- 195) **AUTHORS:** Cernicharo, J.
TITLE: ASTRONOMICAL RADIO RECEPTION TECHNIQUES TO DETECT THE EMISSION OF MOLECULAR AND SHORT LIVED SPECIES IN A COLD PLASMA/GAS CHAMBER
CONFERENCE/JOURNAL: French National Program of Physique et Chimie des Milieux Interstellaire et Circumstellaire (PCMI) - ASTROLILLE 2016 (24 – 28 Octubre, 2016)
- 196) **AUTHORS:** Marcelino, Nuria, Cernicharo, J., Roueff, E., Gerin, M., Fuente, A.
TITLE: THE CHEMICAL INVENTORY OF PRE/PROTO-STELLAR CORES

CONFERENCE/JOURNAL: American Astronomical Society, 2016, AAS Meeting #223, #331.06

- 197) **AUTHORS:** Cernicharo, J.
TITLE: MOLECULAR SPECTROSCOPY IN SPACE: DISCOVERING NEW MOLECULES FROM LINE SURVEYS AND LABORATORY SPECTROSCOPY
CONFERENCE/JOURNAL: 71st International Symposium on Molecular Spectroscopy: June 20-24, 2016 at The University of Illinois at Urbana-Champaign.
- 198) **AUTHORS:** Cazzoli, G.; Puzzarini, C.; Lattanzi, V.; Tercero, B.; **Cernicharo, J.**
TITLE: LABORATORY MEASUREMENTS AND ASTRONOMICAL SEARCH OF THE HSO RADICAL
CONFERENCE/JOURNAL: 71st International Symposium on Molecular Spectroscopy: June 20-24, 2016 at The University of Illinois at Urbana-Champaign.
- 199) **AUTHORS:** Jabri, A.; Kleiner, I.; Motiyenko, R. A.; Margulès, L.; Guillemin, J.-C.; Alekseev, E. A.; Tercero, B.; **Cernicharo, J.**
TITLE: LABORATORY ROTATIONAL SPECTRUM AND ASTRONOMICAL SEARCH OF S-METHYL THIOFORMATE
CONFERENCE/JOURNAL: 71st International Symposium on Molecular Spectroscopy: June 20-24, 2016 at The University of Illinois at Urbana-Champaign.
- 200) **AUTHORS:** Kolesniková, L.; Alonso, J. L.; Bermúdez, C.; Alonso, E. R.; Tercero, B.; **Cernicharo, J.**; Guillemin, J.-C.
TITLE: MILLIMETER WAVE SPECTRA OF METHYL CYANATE, METHOXYAMINE AND N-METHYLHYDROXYLAMINE LABORATORY STUDIES AND ASTRONOMICAL SEARCH IN SPACE
CONFERENCE/JOURNAL: 71st International Symposium on Molecular Spectroscopy: June 20-24, 2016 at The University of Illinois at Urbana-Champaign.
- 201) **AUTHORS:** Kisiel, Z.; Kolesniková, L.; Alonso, E. R.; Alonso, J. L.; Winnewisser, M.; De Lucia, F. C.; Medvedev, I.; Tercero, B.; **Cernicharo, J.**; Guillemin, J.-C.
TITLE: FURTHER ANALYSIS OF THE LABORATORY ROTATIONAL SPECTRUM OF CH₃NCO
CONFERENCE/JOURNAL: 71st International Symposium on Molecular Spectroscopy: June 20-24, 2016 at The University of Illinois at Urbana-Champaign.
- 202) **AUTHORS:** Quintana-Lacaci, G.; **Cernicharo, J.**; Agúndez, M.; Velilla Prieto, L.; Castro-Carrizo, A.; Marcelino, N.; Cabezas, C.; Peña, I.; Alonso, J. L.; Zuñiga, J.; and 5 coauthors
TITLE: A ROTATING SPIRAL STRUCTURE IN THE INNERMOST REGIONS AROUND IRC+10216
CONFERENCE/JOURNAL: Journal of Physics: Conference Series, Volume 728, Issue 2, article id. 022005 (2016).
- 203) **AUTHORS:** Cox, N. L. J.; Pilloni, P.; Berné, O.; **Cernicharo, J.**; Joblin, C.
TITLE: PAH AND H₂ EMISSION IN THE RING NEBULA
CONFERENCE/JOURNAL: Journal of Physics: Conference Series, Volume 728, Issue 3, article id. 032011 (2016).
- 204) **AUTHORS:** García-Hernández, D. A.; García-Lario, P.; **Cernicharo, J.**; Engels, D.; Perea-Calderón, J. V.
TITLE: TRANSITORY O-RICH CHEMISTRY IN HEAVILY OBSCURED C-RICH POST-AGB STARS
CONFERENCE/JOURNAL: Journal of Physics: Conference Series, Volume 728, Issue 3, article id. 032011 (2016).
- 205) **AUTHORS:** Goicoechea, J. R.; Etxaluze, M.; **Cernicharo, J.**; Gerin, M.; Pety, J.
TITLE: FIR SPECTROSCOPY OF THE GALACTIC CENTER: HOT AND WARM MOLECULAR GAS
CONFERENCE/JOURNAL: The Multi-Messenger Astrophysics of the Galactic Centre, Proceedings of the International Astronomical Union, IAU Symposium, Volume 322, pp. 168-169 (2017)

- 206)** **AUTHORS:** Fuente, A.; Agúndez, M.; **Cernicharo, J.**; Goicoechea, J. R.; Bachiller, R.
TITLE: DETECTION OF SO TOWARDS THE TRANSITIONAL DISK AB AURIGA: THE SULFUR CHEMISTRY IN A PROTO-SOLAR NEBULA
CONFERENCE/JOURNAL: Highlights on Spanish Astrophysics IX, Proceedings of the XII Scientific Meeting of the Spanish Astronomical Society held on July 18-22, 2016, in Bilbao, Spain, (2017)
- 207)** **AUTHORS:** McCarthy, M. C.; Gottlieb, C. A.; **Cernicharo, J.**
TITLE: BUILDING BLOCKS OF DUST AND LARGE ORGANIC MOLECULES: A COORDINATED LABORATORY AND ASTRONOMICAL STUDY OF AGB STARS
CONFERENCE/JOURNAL: 72nd International Symposium on Molecular Spectroscopy: June 19-23, 2017 at The University of Illinois at Urbana-Champaign.
- 208)** **AUTHORS:** Cazzoli, G.; Lattanzi, V.; Coriani, S.; Gauss, J.; Codella, C.; Ramos, A. A.; **Cernicharo, J.**; Puzzarini, C.
TITLE: ZEEMAN EFFECT IN SULFUR MONOXIDE: A PROBE TO OBSERVE MAGNETIC FIELDS IN STAR FORMING REGIONS?
CONFERENCE/JOURNAL: 72nd International Symposium on Molecular Spectroscopy: June 19-23, 2017 at The University of Illinois at Urbana-Champaign.
- 209)** **AUTHORS:** Jabri, A.; Motiyenko, R. A.; Margulès, L.; Guillemin, J.-C.; Alekseev, E. A.; Kleiner, I.; Tercero, B.; **Cernicharo, J.**
TITLE: MILLIMETER WAVE SPECTRUM OF THE TWO MONOSULFUR DERIVATIVES OF METHYL FORMATE: S- AND O-METHYL THIOFORMATE, IN THE GROUND AND THE FIRST EXCITED TORSIONAL STATES
CONFERENCE/JOURNAL: 72nd International Symposium on Molecular Spectroscopy: June 19-23, 2017 at The University of Illinois at Urbana-Champaign.
- 210)** **AUTHORS:** Bermúdez, C.; Margulès, L.; Motiyenko, R. A.; Tercero, B.; **Cernicharo, J.**; Guillemin, J.-C.; Ellinger, Y.
TITLE: MILLIMETER WAVE SPECTRUM OF METHYL KETENE AND ITS SEARCH IN ORION
CONFERENCE/JOURNAL: 72nd International Symposium on Molecular Spectroscopy: June 19-23, 2017 at The University of Illinois at Urbana-Champaign.
- 211)** **AUTHORS:** Margulès, L.; Bailleux, S.; Motiyenko, R. A.; Guillemin, J.-C.; **Cernicharo, J.**; Belloche, A.; McGuire, B. A.; Remijan, A.; Dorovskaya, O.; Ilyushin, V.
TITLE: THZ SPECTROSCOPY OF SULFUR DERIVATIVES OF ASTROPHYSICAL INTEREST
CONFERENCE/JOURNAL: 72nd International Symposium on Molecular Spectroscopy: June 19-23, 2017 at The University of Illinois at Urbana-Champaign.
- 212)** **AUTHORS:** **Cernicharo, J.**; Pardo, J. R.; Gallego, J. D.; de Vicente, P.; Tanarro, I.; Herrero, V. J. Doménech, J. L.; Peláez, R. J.
TITLE: RADIO ASTRONOMY RECEIVERS AND A GAS REACTION CHAMBER FOR LABORATORY ASTROCHEMICAL SIMULATIONS
CONFERENCE/JOURNAL: 72nd International Symposium on Molecular Spectroscopy: June 19-23, 2017 at The University of Illinois at Urbana-Champaign.
- 213)** **AUTHORS:** Goicoechea, J. R.; Cuadrado, S.; Pety, J.; Aguado, A.; Black, J. H.; Bron, E.; **Cernicharo, J.**; Chapillon, E.; Fuente, A.; Gerin, M.; and 3 coauthors
TITLE: THE ALMA VIEW OF UV-IRRADIATED CLOUD EDGES: UNEXPECTED STRUCTURES AND PROCESSES
CONFERENCE/JOURNAL: Astrochemistry VII: Through the Cosmos from Galaxies to Planets, Proceedings of the International Astronomical Union, IAU Symposium, Volume 332, pp. 210-217 (2018)
- 214)** **AUTHORS:** Massalkhi, S.; Agúndez, M.; **Cernicharo, J.**; Fonfría, J. P.; Santander-García, M.
TITLE: THE ABUNDANCE OF SIC₂ IN CARBON STAR ENVELOPES
CONFERENCE/JOURNAL: Astrochemistry VII: Through the Cosmos from Galaxies to Planets, Proceedings of the International Astronomical Union, IAU Symposium, Volume 332, pp. 261-269 (2018)

- 215) **AUTHORS:** Santa-Maria, M. G.; Goicoechea, J. R.; Bron, E.; Teyssier, D.; Marcelino, N.; Cernicharo, J.; Cuadrado, S.
TITLE: WIDESPREAD FUV-IRRADIATED WARM AND DENSE GAS IN ORION MOLECULAR CLOUD (OMC-1)
CONFERENCE/JOURNAL: Highlights on Spanish Astrophysics X, Proceedings of the XIII Scientific Meeting of the Spanish Astronomical Society held on July 16 – 20, 2018, in Salamanca, Spain (2019)
- 216) **AUTHORS:** Sánchez Contreras, C.; Alcolea, J.; Bujarrabal, V.; Castro-Carrizo, A.; Velilla Prieto, L.; Santander-García, M.; Quintana-Lacaci, G.; **Cernicharo, J.**
TITLE: THE INTRICATE NEBULAR ARCHITECTURE OF THE ROTTEN EGG DISCLOSED BY ALMA
CONFERENCE/JOURNAL: Highlights on Spanish Astrophysics X, Proceedings of the XIII Scientific Meeting of the Spanish Astronomical Society held on July 16 – 20, 2018, in Salamanca, Spain (2019)
- 217) **AUTHORS:** Margulès, L., Motiyenko, R. A., Ilyushin, V., Dorovskaya, Olga, Alekseev, E. A., Alonso, E.R., Kolesniková, L., **Cernicharo, J.**, Guillemin, J.-C.
TITLE: SUBMILLIMETER WAVE SPECTROSCOPY AND ISM SEARCH FOR PROPIONIC ACID
CONFERENCE/JOURNAL: 74th International Symposium on Molecular Spectroscopy: June 17-21, 2019 at The University of Illinois at Urbana-Champaign. Talk RG08
- 218) **AUTHORS:** Cabezas, Carlos, Bermúdez, Celina, Gallego, Juan Daniel, Tanarro, Isabel, Doménech, José Luis, Herrero, Victor Jose, Tercero, Belén, Lebrón, Rosa, Quintanilla, Jesús Eduardo, Soria, Ana Cristina, **Cernicharo, Jose**
TITLE: THE MILLIMETERWAVE SPECTRUM OF SUCCINONITRILE
CONFERENCE/JOURNAL: 74th International Symposium on Molecular Spectroscopy: June 17-21, 2019 at The University of Illinois at Urbana-Champaign. Talk TA08
- 219) **AUTHORS:** Kisiel, Zbigniew, Kolesniková, Lucie, Alonso, Elena R., **Cernicharo, Jose**, Guillemin, J. - C., Alonso, José L.
TITLE: THE LABORATORY ROTATIONAL STUDY OF METHYL ISOCYNATE
CONFERENCE/JOURNAL: 74th International Symposium on Molecular Spectroscopy: June 17-21, 2019 at The University of Illinois at Urbana-Champaign. Talk TG02
- 220) **AUTHORS:** Bermúdez, Celina, Cabezas, Carlos, Tanarro, Isabel, Doménech, José Luis, Herrero, Victor Jose, Gallego, Juan Daniel, de Vicente, Pablo, Tercero, Félix, López Pérez, José Antonio, **Cernicharo, José**
TITLE: THE NANOCOSMOS GAS CELL: A BROADBAND FOURIER TRANSFORM MILLIMETERWAVE SPECTROMETER BASED ON RADIO ASTRONOMY RECEIVERS
CONFERENCE/JOURNAL: 74th International Symposium on Molecular Spectroscopy: June 17-21, 2019 at The University of Illinois at Urbana-Champaign. Talk **TG06**
- 221) **AUTHORS:** Bermúdez, Celina, Cabezas, Carlos, Gallego, Juan Daniel, Hernandez, José Manuel, Tanarro, Isabel, Doménech, José Luis, Herrero, Victor Jose, Tercero, Belén, Soria, Ana Cristina, Lebrón, Rosa, Quintanilla, Jesús Eduardo, **Cernicharo, José**
TITLE: THE NANOCOSMOS GAS CELL: A BROADBAND FOURIER TRANSFORM MILLIMETERWAVE SPECTROMETER BASED ON RADIO ASTRONOMY RECEIVERS
CONFERENCE/JOURNAL: 74th International Symposium on Molecular Spectroscopy: June 17-21, 2019 at The University of Illinois at Urbana-Champaign. Talk **TG07**
- 222) **AUTHORS:** Pilbratt, Göran ; Griffin, Matt ; Barthel, Peter ; **Cernicharo, José**; De Graauw, Thijs ; Encrénaz, Pierre ; Fischer, Jacqueline ; Garcia-Lario, Pedro ; Harvey, Paul ; Harwit, Martin ; Helmich, Frank ; Poglitsch, Albrecht ; Sturm, Eckhard ; Vigroux, Laurent ; Waelkens, Christoffel
TITLE: THE HERSCHEL SPACE OBSERVATORY DEVELOPMENT, OPERATION AND POST-OPERATIONS: LESSONS LEARNED
CONFERENCE/JOURNAL: Proceedings of the SPIE, Volume 11443, id. 1144309 15 pp. (2020), DOI:10.1117/12.2561116

AUTHORS: Cernicharo, J.

TITLE: THE COMPLEX CHEMISTRY OF HYDROCARBON CYCLES IN TMC-1

CONFERENCE/JOURNAL: European Conference on Laboratory Astrophysics, 26 Sept-1 Oct 2021, Capri (Italy). Hot topic invited review

223) **AUTHORS:** Cernicharo, J.

TITLE: BROADBAND ROTATIONAL SPECTROSCOPY FOR LABORATORY ASTROPHYSICS

CONFERENCE/JOURNAL: European Conference on Laboratory Astrophysics, 26 Sept-1 Oct 2021, Capri (Italy). Invited talk.

224) **AUTHORS:** Montiel, E.J., Fonfría, J.P., Richter, M.J., DeWitt, C.N., Cernicharo, J.

TITLE: EARLY RESULTS FROM SOFIA/EXES HIGH RESOLUTION SPECTROSCOPIC OBSERVATIONS OF CIRCUMSTELLAR ENVELOPES OF AGB STARS

CONFERENCE/JOURNAL: The 20.5th Cambridge Workshop on Cool Stars, Stellar Systems, and the Sun (CS20.5), virtually anywhere, March 2-4, 2021. Online at <http://coolstars20.cfa.harvard.edu/cs20half>, id.289. DOI: 10.5281/zenodo.4569960

AUTHORS: Fonfría, J. P. ; Montiel, E. J. ; Cernicharo, J. ; DeWitt, C. N. ; Richter, M. J.

TITLE: DETECTION OF INFRARED FLUORESCENCE OF CARBON DIOXIDE IN R LEONIS WITH SOFIA/EXES

CONFERENCE/JOURNAL: The 20.5th Cambridge Workshop on Cool Stars, Stellar Systems, and the Sun (CS20.5), virtually anywhere, March 2-4, 2021. Online at <http://coolstars20.cfa.harvard.edu/cs20half>, id.146. DOI: 10.5281/zenodo.4564468

AUTHORS: Cernicharo, Jose, Cabezas, Carlos, Agúndez, Marcelino, Tercero, Belén, de Vicente, Pablo, Marcelino, Nuria, Pardo, Juan R.

TITLE: A SENSITIVE LINE SURVEY OF TMC-1: THE CHEMICAL COMPLEXITY OF A COLD DARK CLOUD

CONFERENCE/JOURNAL: 2021 International Symposium on Molecular Spectroscopy (Virtual): June 21-25, 2021. Talk TJ05. DOI: 10.15278/isms.2021.TJ05

AUTHORS: C. Sánchez Contreras, J. Alcolea, R. Rodríguez-Cardoso, V. Bujarrabal, A. Castro-Carrizo, L. Velilla-Prieto, G. Quintana-Lacaci, M. Santander-García, M. Agúndez and J. Cernicharo

TITLE: ALMA (FINALLY!) DISCLOSES A ROTATING DISK+BIPOLAR WIND SYSTEM AT THE CENTRE OF THE WIND-PROMINENT PPN OH231.8+4.2

CONFERENCE/JOURNAL: The Origin of Outflows in Evolved Stars. Proceedings of the Conference held virtually, 1-6 November, 2021. Originally planned for Leuven, Belgium. Edited by L. Decin, A. Zijlstra, and C. Gielen. Proceedings of the International Astronomical Union, Volume 366, pp. 301-307

225) **AUTHORS:** Edward Montiel, Jason Dittmann, Sarah Nickerson, Abraham Boogert, Jose Cernicharo, Imke de Pater, Drake Deming, Curtis DeWitt, José Pablo Fonfría, Guido Fuchs, Steven Goldman, Karl Gordon, Graham Harper, Kathleen Kraemer, Laura Kreidberg, Patrick Morris, Conor Nixon, Glenn Orton, Naseem Rangwala, Maisie Rashman, Matthew Richter, Ravi Sankrit, Gregory Sloan, Archana Soam, Clara Sousa-Silva, Alexander Tielens, and William Vacca

TITLE: SEEING THE TREES THROUGH THE FOREST: EARLY RESULTS FROM THE SOFIA/EXES MID-IR HIGH SPECTRAL RESOLUTION LIBRARY CLOUD

CONFERENCE/JOURNAL: 2021 International Symposium on Molecular Spectroscopy (Virtual): June 21-25, 2021. Talk TJ05. DOI: 10.15278/isms.2021.TJ05

226) **AUTHORS:** Marcelino, N., Cernicharo, J., Agúndez, M., Tercero, B., Cabezas, C., de Vicente, P.

TITLE: A COMPLETE 3MM LINE SURVEY OF THE B1-B AND TMC-1 CORES. NEW DISCOVERIES WITH THE IRAM 30M AND YEBES 40M TELESCOPES

CONFERENCE/JOURNAL: Multi-line Diagnostics of the Interstellar Medium, Nice, France, Edited by Bouscasse, L.; Kramer, C.; Gueth, F.; EPJ Web of Conferences, Volume 265, id.00021. DOI: 10.1051/epjconf/202226500021

227) **AUTHORS:** Cernicharo, J., Agúndez, M., Cabezas, C., Marcelino, N., Tercero, B., Pardo, J.R., Fuentetaja, R., de Vicente, P.

TITLE: THE QUIJOTE LINE SURVEY OF TMC-1

CONFERENCE/JOURNAL: Multi-line Diagnostics of the Interstellar Medium, Nice, France, Edited by Bouscasse, L.; Kramer, C.; Gueth, F.; EPJ Web of Conferences, Volume 265, id.00041. *DOI:* [10.1051/epjconf/202226500041](https://doi.org/10.1051/epjconf/202226500041)

228) **AUTHORS:** Guélin, M., Kramer, C., Yang, C., Tercero, B., **Cernicharo, J.**

TITLE: GAS PROPERTIES IN THE EARLY UNIVERSE DECIPHERED FROM SPECTRAL LINE SURVEYS OF HIGH-Z OBJECTS: THE CLOVERLEAF QUASAR

CONFERENCE/JOURNAL: Multi-line Diagnostics of the Interstellar Medium, Nice, France, Edited by Bouscasse, L.; Kramer, C.; Gueth, F.; EPJ Web of Conferences, Volume 265, id.00024. *DOI:* [10.1051/epjconf/202226500024](https://doi.org/10.1051/epjconf/202226500024)

229) **AUTHORS:** Guélin, M., Kramer, C., Yang, C., Tercero, B., **Cernicharo, J.**

TITLE: GAS PROPERTIES IN THE EARLY UNIVERSE DECIPHERED FROM SPECTRAL LINE SURVEYS OF HIGH-Z OBJECTS: THE CLOVERLEAF QUASAR

CONFERENCE/JOURNAL: Multi-line Diagnostics of the Interstellar Medium, Nice, France, Edited by Bouscasse, L.; Kramer, C.; Gueth, F.; EPJ Web of Conferences, Volume 265, id.00024. *DOI:* [10.1051/epjconf/202226500024](https://doi.org/10.1051/epjconf/202226500024)

ANNEX III

TECHNICAL REPORTS

TITLE: 30-M TELESCOPE STATUS

AUTHORS: Equipo comisionado del 30-M (responsables M. Guélin y J. Gómez).

IRAM WORKING PROGRESS REPORTS (Un informe semanal **1984-1985**).

TITLE: ATM : A PROGRAM TO COMPUTE ATMOSPHERIC TRANSMISSION BELOW 1000 GHz
(este programa es utilizado en la mayoría de los radio observatorios milimétricos Europeos)

AUTHORS: J. Cernicharo

IRAM INTERNAL REPORT **1985**

TITLE: CALIBRACION ESPECTRAL PARA EL USO DE LOS OPERADORES DEL 30-M (en español)

AUTHORS: J. Cernicharo

IRAM INTERNAL REPORT 1988

TITLE: COUPLING EFFICIENCIES BETWEEN THE TELESCOPE AND THE SKY

AUTHORS: P. André, J. Cernicharo

IRAM INTERNAL REPORT 1989

TITLE: 30-M TELESCOPE STATUS REPORT (FOR THE PROGRAM COMMITTEE AND THE SCIENTIFIC ADVISORY COMMITTEE)

AUTHORS: C. Thum, J. Cernicharo

IRAM INTERNAL REPORTS (Un informe cada cuatro meses entre Abril 1988-Agosto 1991).

TITLE: CAN WE IMPROVE THE 30-M POINTING ACCURACY ?. I. THERMAL VARIATIONS OF THE ENCODERS READINGS AND SMALL EFFECTS ON THE POINTING. SUMMER 1988-NOVEMBER 1990

AUTHORS: J. Cernicharo, J. Peñalver

IRAM INTERNAL REPORT 1990 (dos años de trabajo)

TITLE: CAN WE IMPROVE THE 30-M POINTING ACCURACY ?. II. THERMAL INFLUENCE ON THE TELESCOPE TILT.

AUTHORS: J. Cernicharo, J. Peñalver

IRAM INTERNAL REPORT 1991

TITLE: THE NEW DISTRIBUTION BOX FOR THE 30-M RADIOTELESCOPE

AUTHORS: J. Cernicharo, G. Buttin, G. Paubert, S. Lietchi, H. Steppe

IRAM INTERNAL REPORT 1990

TITLE: RECEIVER STATUS

AUTHORS: En colaboración con los ingenieros y astrónomos del IRAM

IRAM INTERNAL NOTES (varias entre **1984-1990**)

TITLE: CONCLUSIONS OF AOS TEST ON THE 30-M RADIOTELESCOPE AT PICO VELETA

AUTHORS: A. Greve, J. Cernicharo, G. Paubert, P. Colom, Lecacheux, Dierich

IRAM INTERNAL REPORT 1989

TITLE: DELIVERING TEST OF THE MEUDON ACUSTO OPTICAL SPECTROMETER (AOS) TO IRAM

AUTHORS: J. Cernicharo, B. Lazareff, G. Paubert, C. Thum, P. Dierich, A. Lecacheux, C. Rosolen

IRAM INTERNAL REPORT 1990

TITLE: LINE CALIBRATORS FOR THE 30-M RADIOTELESCOPE (una segunda versión de este report ha sido publicada en *Astronomy and Astrophysics*)

AUTHORS: R. Mauersberger, M. Guélin, J. Martín-Pintado, C. Thum, **J. Cernicharo**, H. Hein, S. Navarro.
IRAM INTERNAL REPORT 1989

TITLE: EL PROGRAMA DE CONTROL DEL TELESCOPIO DE 1.52m DE LA EOCA

AUTHORS: **J. Cernicharo**

Informe Técnico EOCA N.1 (IGN-OAN)

TITLE: COMO APUNTAR EL TELESCOPIO DE 1.52m DE LA EOCA CON UNA PRECISION DE UN PASO DE CODIFICADOR

AUTHORS: **J. Cernicharo**

Informe Técnico EOCA N.2 (IGN-OAN)

TITLE: LA CAMARA CCD DEL OAN (CCDOAN) EN EL TELESCOPIO DE 1.5m DE CALAR ALTO: INSTALACION Y PRIMEROS TESTS

AUTHORS: J.A. Abad, J. Alcolea, R. Bachiller, A. Barcia, A. Campos, **J. Cernicharo**, J.D. Gallego, S. García-Burillo, J. Gómez-González, J.P. Hernandez, J.A. López, M. Moles, N. Rodríguez, M.J. Sempere

Informe Técnico EOCA N.3 (IGN-OAN)

TITLE: FIRST PROOF OF CONCEPT OF THE NANOCOSMOS PROJECT: A GAS CHAMBER AT THE 40M RT

AUTHORS: P. de Vicente, **J. Cernicharo**, J. A. Martín-Gago, J. D. Gallego, K. Lauwaet, M.- Pérez, F. Tercero, G. Santoro

CDT (Centro de Desarrollos Tecnológicos, Observatorio de Yebes) Technical Report 2015-15