THE TWENTY-NINTH COLLOQUIUM ON HIGH RESOLUTION MOLECULAR SPECTROSCOPY

COLOGNE 2025

25 August – 29 August, 2025

https://hrms2025.astro.uni-koeln.de

CRC1601

COLOGNE CENTER FOR TERAHERTZ SPECTROSCOPY

Executive Committee

THERESE HUET
Laboratoire PhLAM
Université de Lille
CNRS UMR 8523
France

FREDERIC MERKT
Lab. für Physikalische Chemie,
ETH Zürich,
Switzerland

PAOLO DE NATALE
Istituto Nazionale di Ottica-CNR
Firenze,
Italy

Local Organizer

STEPHAN SCHLEMMER
Laboratory Astrophysics and Spectroscopy
Universität zu Köln
Germany

Scientific Committee

V. BOUDON
A. CSÁSZÁR
P. DE NATALE
L. HALONEN
T. HUET
I. KLEINER
F. MERKT
S. SCHLEMMER
M. E. SANZ
J. TENNYSON
J. VANDER AUWERA
R. WESTER
S. WILLITSCH

Local Organizing Committee

O. ASVANY
I. BRELOY
L. BONAH
D. GUPTA
F. LEWEN
B. HEYNE
H.S.P. MÜLLER
T. SALOMON
S. SCHLEMMER
D. SEIFRIED
F. SCHLÖDER
S. THORWIRTH

First Circular: November 29, 2024

The twenty-ninth International Colloquium on High-Resolution Molecular Spectroscopy HRMS-29 will be held at the "Department of Physics" of the "University of Cologne", KÖLN – GERMANY (approximately 20 min by tramway from the train station [Köln Hbf]). The local organization will be undertaken by the "Laboratory Astrophysics Group" of the I. Physikalisches Institut, Universität zu Köln.

Scientific Program:

There will be **20 invited lectures** including **3 mini-symposia** on the specific topics of *interstellar astrophysics*, *non-covalent interactions* and *clocks and metrology*. Parallel sessions will feature **36 contributed lectures** given by PhD students and postdocs**.** Several **poster sessions** are also planned. The scientific fields covered are:

- High resolution rotational, vibrational, and electronic spectroscopy of molecules (radicals, ions, complexes, clusters, ...)
- Molecular dynamics
- Theory for the prediction, simulation, and interpretation of spectra
- New techniques for high-resolution spectroscopy
- Applications to atmospheric sciences, astrophysics, planetology, combustion, gas-phase biomolecules, metrology and fundamental physics, cold molecules, etc.

Important dates:

- 2nd circular: **February/March 2025**
- Deadline for final registration and submission of abstracts: **May 30st 2025**
- Deadline for final reservation of accommodations: **tba**
- 3rd circular with meeting information: **July 2025**

Accommodation and Meals:

Single, double and larger rooms have been reserved at two youth hostels which can be easily reached by tram from the conference site. Participants who prefer to stay in hotels should arrange for the reservations themselves. For this purpose, a link to the tourism office of the City of Cologne will be available on the homepage of the colloquium (see below) when registration opens. Hotel reservations should be made early because August is a highly touristic period. Lunch will be available at the campus restaurant "Mensa". During the conference there will be an excursion combined with a banquet.

Fees:

We estimate conference fees to be 400 € (400 US$), with a reduction for students (300 €, 300 US$). This price includes congress participation, welcome on Sunday evening, August 24th, excursion and banquet. Further information (including prices for accompanying persons) will be given in the second circular. Fees will increase after an ***Early Bird Registration*** Period ending May 1.

Please note: No cash payment will be accepted (only credit card or bank transfer payment is possible).

Amat-Mills Prizes:

As in previous colloquia, two prizes will be awarded to the best student talk and the best student poster. Instructions for application will be given in the second circular.

Jon Hougen Travel Award:

Jon Hougen travel awards will be awarded to facilitate the participation of young scientists. Instructions for application will be given in the second circular.

Web page:

Up-to-date information can be found on the conference home page:

https://hrms2025.astro.uni-koeln.de

You may also contact the local organizing committee via E-Mail: **hrms2025@ph1.uni-koeln.de**

Invited Speakers

Pierre Asselin (CNRS, Sorbonne Université, Paris, France)
High-resolution infrared spectroscopies of jet-cooled large molecules relevant for astronomical and atmospheric issues

Sandra Eibenberger-Arias (Fritz-Haber-Institute of the Max-Planck-Society, Berlin, Germany)
Coherent control of chiral molecules

Wolfgang E. Ernst (Graz University of Technology, Austria)
Molecular Spectroscopy in Helium Nanodroplets - New Insights and Opportunities

Jürgen Gauss (Johannes-Gutenberg-Universität Mainz, Germany)
Recent Advances in the Quantum-Chemical Calculations of Spectroscopic Parameters for Rovibrational Spectroscopy

Jeremy Harrison (University of Leicester, United Kingdom)
Using molecular spectroscopy to investigate the Earth's atmosphere from orbit

Laura Kreidberg (Max Planck Institute for Astronomy, Heidelberg, Germany)
Exoplanet Atmospheric Chemistry in the JWST Era

Marsha I. Lester (University of Pennsylvania, Philadelphia, U.S.A.)
Spectroscopy and Unimolecular Decay Dynamics of Reaction Intermediates in atmospheric and combustion chemistry

Jérôme Loreau (KU Leuven, Belgium)
Collisional excitation of molecules in astrophysical environments

Sonia Melandri (Università di Bologna, Italy)
Exploring conformations and non-covalent interactions with rotational spectroscopy

Olivier Pirali (CNRS, Université Paris-Saclay, France)
Probing new radical species using high resolution THz spectroscopy

Minisymposium 1: Interstellar Astrophysics

Arshia Jacob (MPIfR Bonn, Germany)
Interstellar Chemistry: What Molecules Tell Us About the Universe
Laurent Margulès (Université de Lille, France)
From Lille to the Stars: The Quest for Molecules in the Interstellar Medium
Maria-Luisa Senent (CSIC, Madrid, Spain)
Highly correlated ab initio calculations applied to the characterization of astrophysical species
Silvia Spezzano (MPE Garching, Germany)
High-resolution spectroscopy of molecules of astrophysical importance

Minisymposium 2: Non-Covalent Interactions

José Andrés Fernández (Universidad del País Vasco, Spain)
Molecular aggregation: Lessons I learned from molecular spectroscopy in jets
Qian Gou (Chongqing University, People's Republic of China)
The Role of π-π Interactions in Driving Diels-Alder Cycloadditions: Insights from Rotational Spectroscopy
Melanie Schnell (Deutsches Elektronen-Synchrotron und Christian-Albrechts-Universität zu Kiel, Germany)
The interplay of non-covalent interactions revealed with microwave spectroscopy

Minisymposium 3: Clocks and Metrology

Piet Schmidt (PTB Braunschweig und Leibniz Universität Hannover, Germany)
Highly charged ion clocks to test fundamental physics
Jun Ye (JILA, Boulder, U.S.A.)
Clocks and molecular spectroscopy
Tanya Zelevinski (Columbia University, U.S.A.)
Molecular lattice clocks