THE TWENTY-NINTH COLLOQUIUM ON HIGH RESOLUTION MOLECULAR SPECTROSCOPY

COLOGNE 2025

25 August – 29 August, 2025

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

Third Circular: July 31, 2025

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. It is organized by the "Laboratory Astrophysics Group" of the I. Physikalisches Institut, Universität zu Köln. The conference webpage can be found at

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

Venue

The colloquium will be held at the **Physics Institutes of the Universität zu Köln, Zülpicher Str. 77, 50937 Köln**, located about 15 min by tram (tram #18) from Cologne central station. Please see below for further directions as to how to get to the venue.

Scientific Program

There will be **20 invited lectures** including **three mini-symposia** on the specific topics of *interstellar astro-physics*, *non-covalent interactions* and *clocks and metrology*. Parallel sessions will feature **72 contributed lectures.** There will be **four poster sessions with more than 130 contributions**.

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 molecular spectra
- New techniques for high-resolution spectroscopy
- Applications to atmospheric sciences, astrophysics, planetology, combustion, gas-phase biomolecules, metrology and fundamental physics, cold molecules, etc.

Conference program / Overview Table

Hours	Aug 24 2025 Sunday	Aug 25 2025 Monday	Aug 26 2025 Tuesday	Aug 27 2025 Wednesday	Aug 28 2025 Thursday	Aug 29 2025 Friday
8:30		Welcome				
9:00		A: Invited Speakers Marsha I. Lester **Laura Kreidberg**	E: Invited Speakers **Sonia Melandri** **Jérôme Loreau**	I: Invited Speakers **Pierre Asselin** **Wolfgang E. Ernst**	K: Invited Speakers **Olivier Pirali** **Jeremy Harrison**	O: Poster Session
10:30		Coffee break	Coffee break	Coffee break	Coffee break	Coffee break
11:00		B: Poster Session	F: Contributed Lectures	J: Contributed Lectures	L: Poster Session	P: Invited Speakers **Sandra Eibenberger-Arias** **Jürgen Gauss**
12:30		Lunch	Lunch	Lunch	Lunch	Lunch
14:00		C: Minisymposium Interstellar Astrophysics **Arshia Jacob** **Laurent Margulès** **Maria-Luisa Senent** **Silvia Spezzano**	G: Minisymposium Non-Covalent Interactions **José Andrés Fernández** **Qian Gou** **Melanie Schnell**	**14:30** Cologne Sightseeing Tour	M: Minisymposium Clocks and Metrology Molecular Physics Lecture **Jun Ye** **Tanya Zelevinsky** **Piet Schmidt**	
16:00	Welcome & Registration	Coffee break	Coffee break		Coffee break	
16:30		D: Contributed Lectures	H: Poster Session		N: Contributed Lectures	
18:00				**18:30** Conference Dinner		
19:30	Welcome Talk: **Stefanie Walch-Gassner**					
20:00			Public Evening Talk: **Markus Röllig**			

Online program

An interactive detailed colloquium program including abstracts and speaker information is already available online. A mobile/app version of the program will be accessible through this link on Wednesday, August, 6th. Please find your contributions in the schedule and check that your abstracts are reproduced accurately. You may also use these tools to personalize your conference schedule using your Converia login information.

Sunday welcome reception

On Sunday afternoon, all participants are cordially invited to the welcome reception at the conference venue at I. Physikalisches Institut, Universität zu Köln, Zülpicher Str.77, 50937 Köln, starting at 16:00 o'clock. Food, beverages and live music will be served starting at 17:30 o'clock. At 19:30 o'clock Prof. Dr. Stefanie Walch-Gassner, member of I. Physikalisches Institut and chairperson of the German Astronomical Society will introduce the science of the host institution with a talk on star formation.

Plenary sessions/Mini symposia

The plenary and mini-symposia sessions will be held in **Hörsaal I** at the physics institutes, see map below. Duration of invited lectures and the Molecular Physics lecture is **45 minutes** including questions (40'+5'). Duration of mini-symposia lectures is **30 minutes** including questions (25'+5').

Contributed Talks

Contributed talks will be presented in **three parallel sessions in lecture halls I, II, and III ("Hörsaal I", "II", "III").** Each contributed talk will be **15 minutes** including questions (12'+3'). Please make sure you will be staying in time.

Uploading your talk

It is mandatory that you upload your presentation before 21:00 o'clock the day preceding your session. Only pptx and pdf format will be accepted.

Please name your file as: Sx-A.BBB.pptx or Sx-A.BBB.pdf

- S is the session letter.
- x is the talk number in this session.
- A is the speaker's initial.
- BBB. is the speaker's last name.

Please use the upload link provided in the email accompanying this circular.

Poster presentations

In total, there will be **four poster sessions**. These sessions will take place in the "Foyer" of the Physics institutes in front of the lectures halls. Poster boards (**A0 format, "portrait" orientation**) will be available, and pins will be provided. Posters for **session B** and **session H** can be mounted on Sunday or Monday morning and need to be removed on Tuesday evening. Posters for **session L** and **session O** can be mounted on Wednesday and need to be removed by the end of the conference. Authors are expected to be present at their posters during the assigned session.

Amat-Mills Prizes and Jon Hougen Travel-Award

This year, there will be Amat-Mills-prizes awarded to the best two contributed talks given by the applicants. Amat-Mills talks will be presented on Monday (**session D**) and Tuesday (**session F**). Both, the Amat-Mills Prize- and Jon Hougen Travel Award-winners of HRMS2025 will be announced during the conference dinner on Wednesday evening.

Tuesday public lecture

On Tuesday, at 20:00 o'clock Priv-Doz. Dr. Markus Röllig, a former member of I. Physikalisches Institut, Universität zu Köln, and scientific director of the *Physikalischer Verein* in Frankfurt will present an evening lecture entitled "Revealing the cosmos with the James Webb Space Telescope!" also open to the interested public.

How to get to the venue:

Public transport ticket (KombiTicket)

For your convenience, all participants of HRMS2025 will be provided with a public transport ticket **(included in the registration fee).** Information about how to access your **personalized public transport ticket** will be communicated shortly in a separate email. Your ticket will be valid from **Aug 24 02:00 CEST to Aug 30, 03:00 CEST** and can be used **throughout the city of Cologne (price category 1b)** for buses/trams and also for regional trains (RE/RB) within Cologne. For a corresponding map, please check

Cologne rail network map

The Cologne physics institutes can be reached conveniently using several lines: tram #18 (stop **"Eifelwall"**), tram #9 (stop **"Universität"**), RB48/RB26/RE5 (stop "**Köln Süd"**) as indicated in the maps below.

Parking

There is **no parking** in close vicinity to the conference venue. We recommend checking into parking opportunities close to your accommodation and use public transport to get to the venue.

Lunch

For those who have booked mensa vouchers, lunch will be available at the campus restaurant **"Mensa"**, see map below. Alternatively, the closer environment of the Physics Institutes offers many food options satisfying most likings within walking distance.

Social program

Excursions for accompanying persons are planned for Tuesday (26.08.) and Thursday (28.08.). See the webpage for details.

Cologne sightseeing tour

On Wednesday afternoon, Aug 27, there will be guided tours in the Cologne city center followed by the conference dinner in the evening. More details will be provided on the conference web page.

Guided tours and social program will comprise walking in excess of 3 km. Please contact us at hrms2025@ph1.uni-koeln.de if this were restricting your participation in these events.

Conference dinner

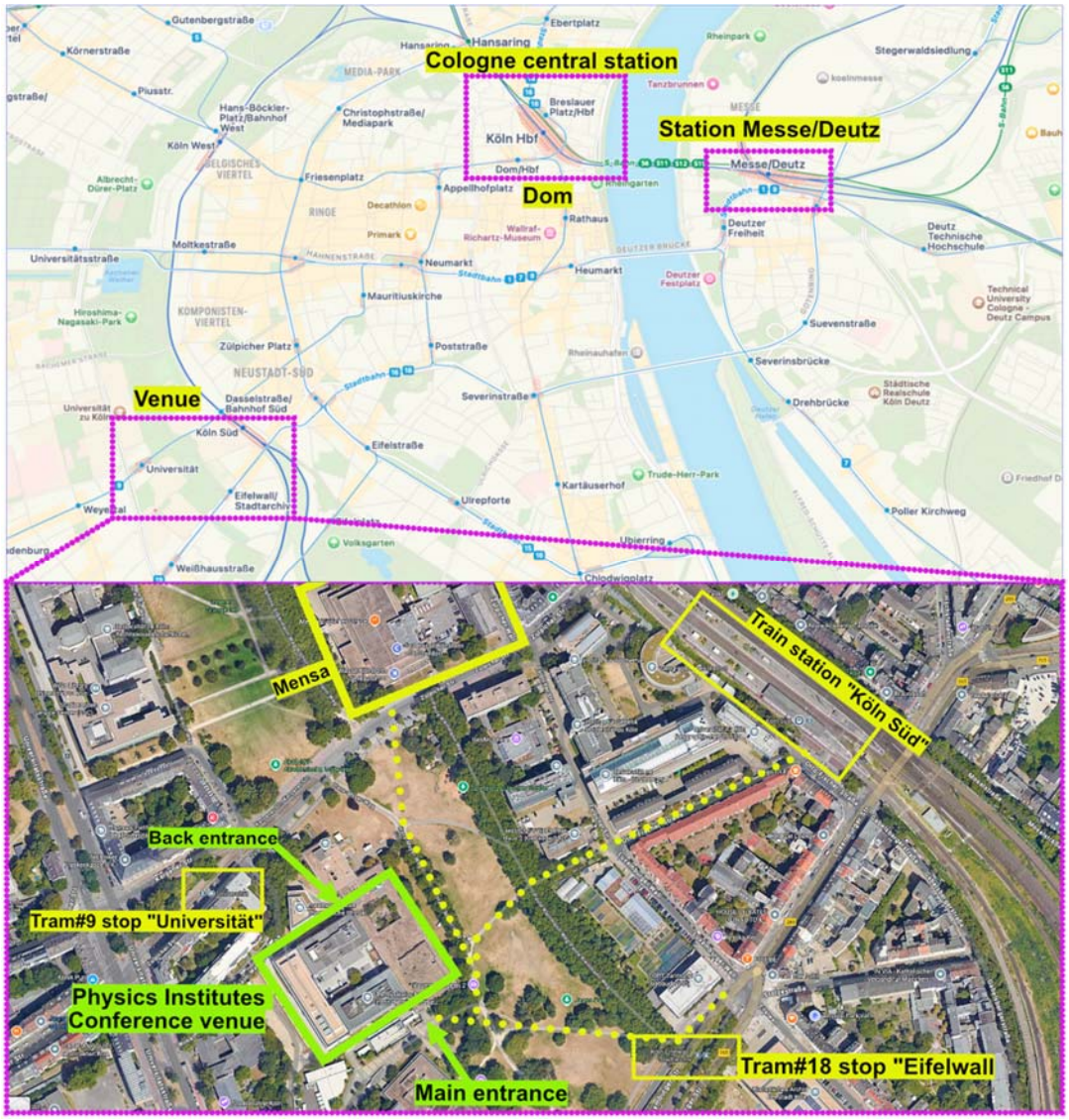
Following the sightseeing tour, the conference dinner will take place on Wednesday evening at **"Haus Unkelbach"** (https://www.hausunkelbach.de/), a typical Cologne inn. Haus Unkelbach is located right next to the tram stop **"Sülzburgstraße"** of tram #18 which also stops, for example, at Cologne central station ("Hauptbahnhof") and the conference venue ("Eifelwall"). Please consult the conference webpage for further details.

Web page
Up-to-date information can be found on the conference home page: https://hrms2025.astro.uni-koeln.de

Lab visits
Visits of the astrophysics laboratories will be offered during the conference. Sign up at the conference desk.

Social run
If you are a runner, we plan for a social run on Monday evening. Bring your running gear!

Maps



Molecular Physics Special Issue
We invite you to contribute manuscripts to a special issue of *Molecular Physics* dedicated to the 29th Colloquium on High-Resolution Molecular Spectroscopy (HRMS 2025). Deadline for submission is December 31, 2025. Detailed information will be communicated at the conference and on the HRMS2025 webpage.

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

Practical Information

Locations:

Conference Venue
I. Physikalisches Institut, Universität zu Köln, Zülpicher Str. 77, 50937 Köln
https://maps.app.goo.gl/KuqXwYDdRzrZnKvr9
Coordinates: 50.92734565594536, 6.933133771817353

Registration desk hours Sun 24.08. 16:00-19:00,
Mon 25.08.-Thu 28.08. 8:30-12:00 and 14:00-18:00
Fri 29.08. 8:30-12:00

University restaurant (Mensa Zülpicher Straße)
https://maps.app.goo.gl/PADJtSmkT5FqmgQE7
Coordinates: 50.92736330498687, 6.932910834302803

Excursion Wednesday afternoon meeting point (Dom)

Meeting Point: An der Kreuzblume in front of "KölnTourismus" (opposite to the main entrance of the Cathedral)
https://www.google.com/maps/place/Kreuzblume
Coordinates: 50.94136909790488, 6.956396308468054
For public transport use tram #18 and get off at Cologne central station ("Hauptbahnhof").

Conference dinner (Haus Unkelbach):
https://maps.app.goo.gl/ggQ6NCEwuwExoY4s7
Coordinates: 50.915273430347824, 6.926751714390481
For public transport use tram #18 and get off at stop "Sülzburgstraße".

Hotels/Accomodation

Youth hostel DJH Cologne Deutz
https://maps.app.goo.gl/4mmymtf5b13ER5WD7
Coordinates: 50.939225678988485, 6.974761540735634
For public transport use tram #9 and get off at stop "Deutzer Freiheit".

Youth hostel DJH Cologne Riehl
https://maps.app.goo.gl/6i5xdcSPmpqknTnf9
Coordinates: 50.96344907136756, 6.986012980407762
For public transport use tram #18 and get off at stop "Boltensternstraße".

Chelsea Hotel
https://maps.app.goo.gl/wd3gsqDB5hNuzTND6
Coordinates: 50.93403931669814, 6.9359592792447575

Nuno Hotel
https://maps.app.goo.gl/GtWi2n5cRu7U7Z8q6
Coordinates: 50.92922256641563, 6.943316057811157

Meininger Hotel Köln West
https://maps.app.goo.gl/dyykd7Vvp8725nFM6
Coordinates: 50.94220443328775, 6.889282390887266

Ibis Köln Zentrum
https://maps.app.goo.gl/qn8EVPaUqs7fJ4hv7
Coordinates: 50.93029933757104, 6.947558821898275

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 on 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 on 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 on 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 Zelevinsky (Columbia University, U.S.A.)
Molecular lattice clocks