

Parity Violation in Molecules

850. WE-Heraeus-Seminar

29 March - 01 April 2026

at the Physikzentrum Bad Honnef, Germany

**WILHELM UND ELSE
HERAEUS-STIFTUNG**



Program

Monday, 30 March 2026

07:30 - 09:00 *BREAKFAST*

Chiral Molecules I

- 09:00 – 09:30 L.D. Barron
(to be presented by
J. Crassous) **Cosmic Chirality both True (Parity
Violation) and False (CP Violation)**
- 09:30 - 10:00 Benoît Darquié **Toward a low-energy test of the
parity symmetry via precise mid-IR
spectroscopy of cold chiral neutral
molecules**
- 10:00 - 10:30 *COFFEE BREAK*
- 10:30 - 11:00 Anastasia Borschevsky **Molecules as probes of the Standard
Model: theoretical perspective**
- 11:00 - 11:15 Wenhao Sun **Exploring Molecular Chirality Using
Microwave Spectroscopy**
- 11:15 - 11:45 Jeanne Crassous **Synthesis of chiral molecules for
fundamental spectroscopic
measurements**
- 11:45 – 12:00 Lukas Pasteka **Selected molecular candidates for
parity violation measurements
investigated by electronic structure
calculations**
- 12:00 – 12:25 *DISCUSSION TIME*
- 12:25 – 12:30 *CONFERENCE PHOTO* (in front of the main entrance)
- 12:30 – 14:00 *LUNCH*

Program

Monday, 30 March 2026

Ions & Traps

| | | |
|---------------|---|--|
| 14:00 - 14:30 | David Leibrandt | Towards precision quantum-logic spectroscopy of chiral molecular ions |
| 14:30 - 15:00 | Jonas Stricker | Production of multiply charged molecules as versatile probes of fundamental physics |
| 15:00 – 15:15 | Yair Rajmiel | Generation of cold CHDBr ⁺ by VUV ionization for precision measurement of PV in molecules |
| 15:15 – 16:00 | COFFEE BREAK | |
| 16:00 – 16:30 | Michael Drewsen | Prospects of photon recoil spectroscopy of complex molecular ions |
| 16:30 – 16:45 | Monika Leibscher | Sympathetic rotational cooling of trapped molecular ions |
| 16:45 – 18:00 | POSTER FLASH | |
| 18:00 – 18:30 | DISCUSSION TIME | |
| 18:30 – 20:00 | DINNER | |
| 20:00 - 22:00 | POSTER SESSION | |
| From 22:00 | <i>Musical jam session</i> (feel free to bring instruments) | |

Program

Tuesday, 31 March 2026

07:30 - 08:45 *BREAKFAST*

BSM Physics I

08:45 - 09:15 Victor Flambaum
(online) **Parity Violation and New Physics**

09:15 – 09:45 Yotam Soreq **P and CP Violation In Molecules as a
Probe Of New Range Hadronic Forces**

09:45 - 10:15 *COFFEE BREAK*

Small Molecules & Atoms I

10:15 – 10:45 Tim Langen **Laser Cooling of Molecules for
Precision Tests of Fundamental
Symmetries**

10:45 – 11:00 Luke Caldwell **Towards YbCaF molecules for probing
nuclear CP violation**

11:00 – 11:30 *DISCUSSION TIME*

Chiral Interactions and Chiral Control

11:30 – 12:00 Yossi Paltiel **Dynamic Breaking of Mirror Symmetry
in Spin-Dependent Electron Transport
through Chiral Media**

12:00 – 12:30 Sandra
Eibenberger Arias **Coherent Control of Chiral Molecules**

12:30 – 14:00 *LUNCH*

Program

Tuesday, 31 March 2026

Small Molecules & Atoms II

- | | | |
|---------------|-----------------------------|---|
| 14:00 – 14:30 | Mikhail Kozlov | Parity-Nonconserving Spin-Spin Vector Coupling In Diatomic Molecules |
| 14:30 – 15:00 | Ronald Fernando Garcia Ruiz | Towards Parity Violation Measurements of Single Molecular Ions in a Penning Trap |
| 15:00 – 15:30 | Svetlana Kotochigova | Relativistic study of rare-earth-containing molecules in search for parity-violating effects |
| 15:30 – 16:00 | <i>COFFEE BREAK</i> | |

In Solution & NMR

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|---------------|--|---|
| 16:00 - 16:30 | Malcolm Levitt | Prospects for NMR detection of parity violation in molecules |
| 16:30 – 17:00 | Giulia Lavarda | From Molecular Design to Light-Driven Function in Chiral Supramolecular Polymers |
| 17:00 – 17:15 | Erik Van Dyke | Detecting molecular parity violation with nuclear magnetic resonance |
| 17:15 – 17:30 | Imre Tóth | High resolution thallium-205 NMR in coordination chemistry |
| 17:30 – 18:00 | DISCUSSION TIME | |
| 18:30 | <i>HERAEUS DINNER</i> <i>(social event with cold & warm buffet with complimentary drinks)</i> | |

Program

Wednesday, 01 April 2026

07:30 - 08:45 *BREAKFAST*

Small Molecules & Atoms III

08:45 - 09:15 Debayan Mitra **Polyatomic Molecular Approach to Parity Violation**

09:15 - 09:45 Emine Altuntas **ZOMBIES: Towards a measurement of the parity-violating nuclear anapole moment of ^{137}Ba in BaF**

09:45 – 10:15 *COFFEE BREAK*

BSM physics II

10:15 – 10:45 Pedro Bargueno (online) **A simple model for long range parity violation between chiral molecules**

10:45 – 11:00 Cedric Quint **Stringent Constraints on New Pseudoscalar & Vector Bosons from Precision Hyperfine Splitting Measurements**

11:00 – 11:30 *DISCUSSION TIME*

Chiral molecules II

11:30 – 12:00 Robert Berger **Parity violating effects in NMR and rotational spectroscopy of chiral molecules**

12:00 – 12:30 Martin Quack **Fundamental Symmetries and Symmetry Violations in Chiral Molecules: the Quantum Dynamics of Parity Violation and Tunneling from High Resolution Spectroscopy**

12:30 – 12:35 Scientific Organizers **Closing Remarks**

12:35 - 14:00 *LUNCH*

End of the seminar and departure

For participants leaving on Thursday a self-service breakfast will be provided on Thursday morning