Symposium Hot topics in cold molecules: From laser cooling to quantum resonances (SYCM)

jointly organized by
the Molecular Physics Division (MO),
the Atomic Physics Division (A), and
the Quantum Optics and Photonics Division (Q)

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Laser cooling and trapping techniques are successfully implemented in the atomic physics community, and nowadays constitute a basic step for the preparation and manipulation of atoms in the quantum regime. Motivated by these achievements, there is an ongoing effort to realize the radiative cooling of molecules, optomechanical devices, plasmas, and condensed-phase systems, which has been leading to a remarkable progress across these fields.

Since molecular systems exhibit several additional degrees of freedom compared to atoms, cold molecules offer many new and exciting research perspectives, encompassing precision measurements, tests of fundamental physics theories and the control of inelastic and reactive collisions.

In recent years, several diatomic molecules have successfully been laser cooled, and nowadays, even the laser cooling of polyatomic molecules is possible. In parallel, other direct and indirect cooling methods have been developed further.

This symposium aims to showcase the recent advances in the field of cold molecules and to trigger discussions between the different divisions about new research perspectives which may soon be within reach.

Overview of Invited Talks and Sessions

(Lecture hall Audimax)

Invited Talks

SYCM 1.1	Fri	14:00–14:30	Audimax	**Collisions between laser-cooled molecules and atoms** — •Michael Tarbutt
SYCM 1.2	Fri	14:30–15:00	Audimax	**Trapped Laser-cooled Molecules for Quantum Simulation, Particle Physics, and Collisions** — •John Doyle
SYCM 1.3	Fri	15:00–15:30	Audimax	**Quantum-non-demolition state detection and spectroscopy of single cold molecular ions in traps** — •Stefan Willitsch
SYCM 1.4	Fri	15:30–16:00	Audimax	**Quantum state tomography of Feshbach resonances in molecular ion collisions via electron-ion coincidence spectroscopy** — •Edvardas Narevicius

Sessions

SYCM 1.1–1.4	Fri	14:00–16:00	Audimax	**Hot topics in cold molecules: From laser cooling to quantum resonances**