Colloquium

SFB 956

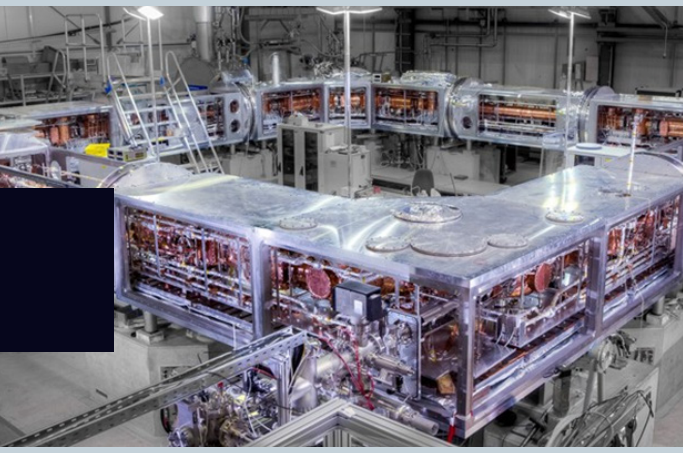
Conditions and Impact of Star Formation

13 December 2021

Monday 3:30 p.m.

MPIfR, Bonn

Videostream



Holger Kreckel

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Astrochemistry at the Cryogenic Storage Ring

The Cryogenic Storage Ring (CSR) at the Max Planck Institute for Nuclear Physics in Heidelberg is the largest electrostatic storage ring project in the world. The CSR combines electrostatic ion optics with extreme vacuum and cryogenic temperatures. The storage ring has a circumference of 35 m, and all deflectors are housed in experimental vacuum chambers that can be cooled down to 5K. It has been shown that within a few minutes of storage inside the CSR infrared-active molecular ions (e.g., CH+, HeH+ and OH-) cool to their lowest rotational quantum states by spontaneous emission of radiation. Equipped with an ion-neutral collision setup and a low-energy electron cooler, the CSR offers unique possibilities for astrochemical experiments under true interstellar conditions. I will present an overview of the capabilities of the CSR, along with first experimental results on collision experiments between cold molecular ions and neutral atoms, free electrons, and photons, yielding quantum state-selective rate coefficients for astrophysically important processes.