

Colloquium

SFB 956

Conditions and Impact of Star Formation

23.04.2013

Tuesday 2:00 pm

Physikalische Institute Köln

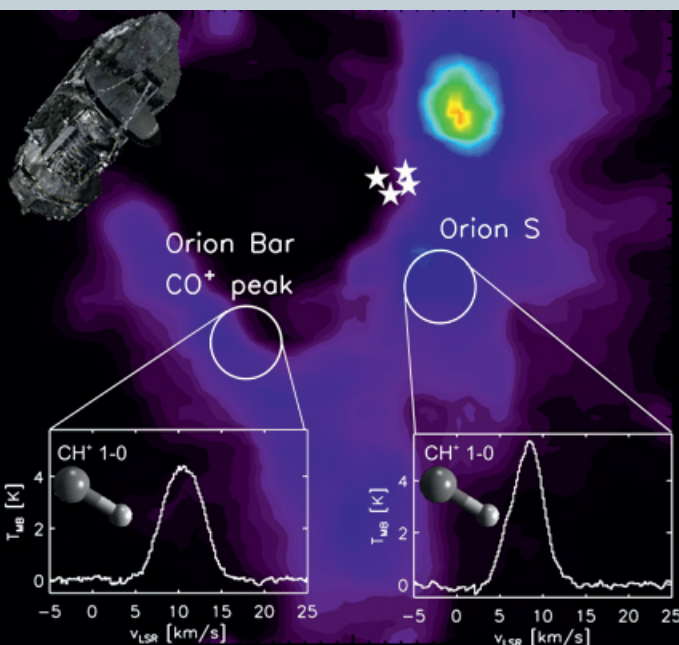
KOSMA room

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The Herschel View of Orion: Reactive Ions and Beyond



The Orion region is the nearest site of ongoing high-mass star formation, located at a distance of about 400 pc. It includes HII regions, Photon Dominated Regions (PDRs), and hot molecular cores. The Orion Bar is a well-studied PDR illuminated by a cluster of young massive stars (Trapezium cluster) and provides an excellent opportunity to study the interaction between star formation and interstellar gas; and the chemistry in PDRs. Though the Orion Bar is the best studied PDR in the Orion region, a larger region is illuminated by the Trapezium cluster and represents a key environment to study chemical reactions in PDRs.

The Heterodyne Instrument for the Far Infrared (HIFI) on board the Herschel Space Observatory allows to carry out spectrally resolved observations of molecular line tracers of PDRs, including reactive ions. Reactive ions such as CH⁺, CO⁺, and OH⁺ react with the most abundant species H, H₂, and electrons on short timescales. In addition to their reactivity, some of these ions require large energy input for their formation via endothermic reactions. Reactive ions were detected in emission using Herschel/HIFI in Orion in a region illuminated by the Trapezium cluster, including the Orion Bar and the FUV-illuminated surface of the Orion S molecular core.

In this talk, Herschel observations of reactive ions in Orion will be discussed with a focus on the Orion Bar and Orion S regions. The observations that will be presented in this talk are part of the HEXOS (Herschel observations of EXtra-Ordinary Sources, PI: E. Bergin) key program. The interpretation of the observations using radiative transfer and PDR models and a comparison of the results to other astrophysical environments such as diffuse regions, high-mass protostars, and X-ray dominated regions will be discussed.