Colloquium

SFB 956

Conditions and Impact of Star Formation

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Monday 3:00 pm

Physikalische Institute Köln

Lecture Hall III

Zülpicher Straße 77 | 50937 Köln

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Looking into the Origins of Molecular Deuteration with SOFIA

In this talk I discuss observational efforts with SOFIA aiming at a better understanding of deuterium chemistry in the interstellar space. The enhancement of deuterium in molecules above the cosmic D/H fraction is particularly strong in dense and cold interstellar clouds. These regions are cites of future star and planet formation. As evidenced by the oceanic D/H ratio, deuteration is also part of the chemical history of our Solar System. SOFIA, equipped with the GREAT receiver, is capable of observing fundamental transitions of the most important molecular carriers of deuterium: HD, H_2D^+, D_2H^+, D_3^+, and CH_2D^+. While HD is the main repository of deuterium in molecular clouds, the mentioned molecular ions work as mediators of deuterium between HD and heavier species. In addition to this gas-phase function, the dissociation of deuterated ions produces free D atoms that accrete onto grains and get involved in interstellar ices. The recently added capacity to observe the ground-state lines of the OH and OD radicals makes SOFIA useful for studying the deuteration of the closely related water in space. Combined with HDO, the abundances of these radicals can also be used for discriminating between gas-phase and grain-surface origins of water.