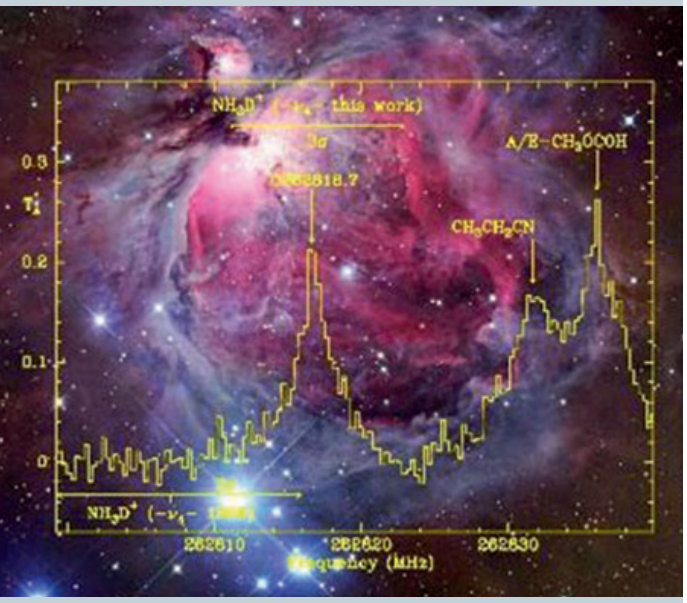
Colloquium

SFB 956

Conditions and Impact of Star Formation

18.05.2015
Monday 4:00 pm

Physikalische Institute Köln
Lecture Hall III
Zülpicher Straße 77 | 50937 Köln



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Cold plasmas in laboratory astrochemistry: Ions and carbonaceous dust analogues

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Cold plasmas are characterized by the lack of equilibrium between the high temperature (10^4-10^5 K) of the electrons and the low temperature (typically 300 K) of the heavy species (ions and neutrals). They provide a highly reactive medium at low temperature and find widespread application in science and technology. Cold plasmas are usually produced in electrical discharges and can be employed for the generation of astrochemically relevant species, unstable under ordinary conditions like radicals or ions, that can then be used for spectroscopic or kinetic studies. The analysis of the plasma chemistry could also give clues about chemical pathways for these species in space.

The high resolution IR spectroscopy of the NH_3D^+ and ArH^+ ions has been investigated in hollow cathode discharges by means of a difference frequency laser technique. The measurements for NH_3D^+ contributed to the recent detection of this ion in the interstellar medium (ISM). The available IR data for the astronomically relevant $^{36}ArH^+$ and $^{38}ArH^+$ isotopes were significantly increased.

Glow discharges of methane were also used to produce different deposits of hydrogenated amorphous carbon (a-C:H), that is a likely candidate for carbonaceous dust in the diffuse ISM. The results are compared with observations and with previous laboratory work.