CFEL SCIENCE

SEMINAR

18th January 2018 - 10:00

Building 99, Seminar Room IV (1. OG)

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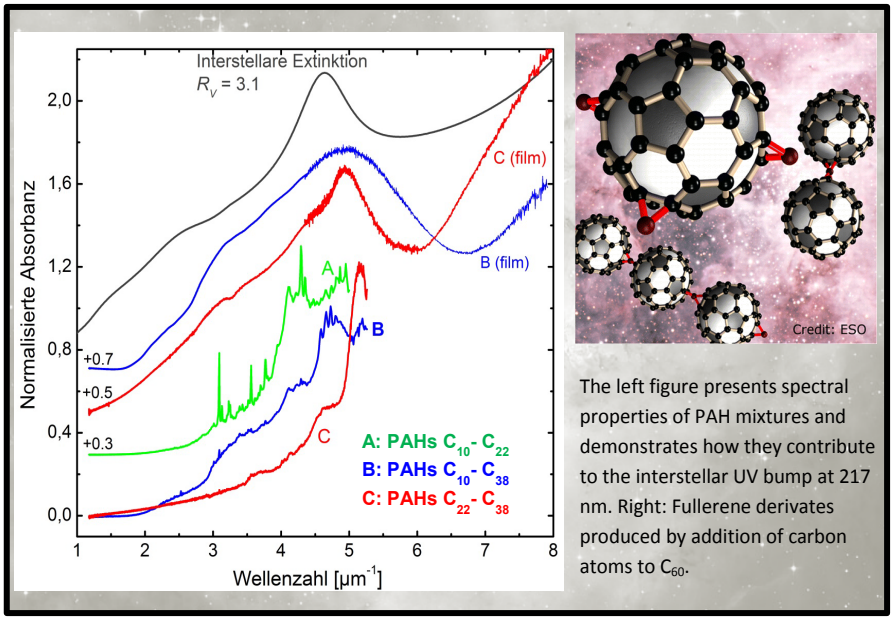
Cosmic Carbonaceous Dust and Molecules from the Laboratory

Carbonaceous dust and molecules including polycyclic aromatic hydrocarbons (PAHs), fullerenes, and complex organic molecules are found in many different astrophysical environments. Such molecules can be formed in gas-phase condensation processes as intermediates and side products on the way to carbonaceous grains. In addition, experimental studies have demonstrated that organic molecules and carbonaceous solids can easily form in ice layers on top of dust grains at temperatures of about 10 K and conditions prevailing in molecular clouds. In order to understand the formation and destruction pathways of small grains, PAHs, fullerenes, and complex organic molecules, dedicated laboratory experiments are necessary to simulate the conditions in circumstellar, interstellar and planetary disks environments. In the talk, I present experimental results on the formation pathways of carbonaceous matter at high and low temperatures and discuss precursors and chemically matured molecules such as PAHs and their spectral properties. The formation of refractory carbonaceous grains is either governed by PAHs or by chain-like carbon molecules. However, carbon grains can also be a source for the formation of carbonaceous molecules. Reactions on the surface or at the interface between dust and ice may lead to the erosion of dust and formation of new molecular species.



The left figure presents spectral properties of PAH mixtures and demonstrates how they contribute to the interstellar UV bump at 217 nm. Right: Fullerene derivates produced by addition of carbon atoms to C_{60}.

Host: Melanie Schnell - CFEL Molecular Physics seminar