EP 9: Planets and small Objects II

Time: Thursday 14:00–14:45 Location: H-HS VIII

Invited Talk EP 9.1 Thu 14:00 H-HS VIII

The CoPhyLab: How to Study Comets in the Laboratory — •Bastian Gundlach — Institut für Geophysik und extraterrestrische Physik, Technische Universität Braunschweig, Deutschland

Comets are kilometer-sized objects, composed of different volatile and refractory species, i.e., ice and dust. They formed in the protoplanetary disc by the gravitational collapse of pebble clouds, typically consisting of mm- to cm-sized aggregates of dust and ice. After their formation, comets were scattered into the outer regions of our solar system and the bulk cometary material remained almost unaltered. Thus, comets are among the most primitive objects of our solar system. When a cometary nucleus enters the inner solar system, the cometary surface warms up and the volatile components start to sublimate. Particles, aggregates and chunks are then ejected off the cometary surface into space. This process leads to the formation of the cometary coma, the dust tail and the dust trail. However, the physical processes related to the ejection of material are still not understood. Laboratory experiments are one possible tool to investigate the activity of comets. This task is currently addressed by the CoPhyLab (Comet Physics Laboratory) an international collaboration among six Partner Institutes with the aim to study the physical processes connected to cometary activity by various experiments and thermophysical modeling.

EP 9.2 Thu 14:30 H-HS VIII

Dielectric properties of surface ice on Enceladus' southpole — •Pia Friend, Alex Kyriacou, and Klaus Helbing — Bergische Universität Wuppertal

Saturn's icy moon Enceladus is with its roughly 500 km diameter a differentiated, geological active body that harbours a liquid ocean between its rocky core and icy mantle. This ocean is among the most promising places to host extraterrestrial life in our solar system. At Enceladus' south pole terrain, active geysers form a passage from the ocean to the surface; erupting ice, dust and gas particles. Most of those particles escape the moon's gravity, but some portion falls back to the surface. Considering the current output, and depending on the timescale the geysers are active at the same location, the snow layer could have a thickness of some km already. A first model of the density profile of the snow layer as a function of the ice/vacuum ratio will be provided at the conference. From this, it is possible to define the dielectric properties of the snow layer. A well-defined dielectric profile in turn could help to radar navigate a melting probe through the ice on Enceladus during a possible future space mission.