

MICROGRAVITY SCIENCES AND PROCESSES (A2)  
Gravity and Fundamental Physics (1)

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## PHOTOPHORESIS IN PLANET FORMATION AND A PARTICLE MANIPULATION TOOL FOR IPE

**Abstract**

The early stages of planet formation are characterized by growth of fractal aggregates within a rarefied gas environment, starting from (sub-)micrometer-sized grains to (fractal) aggregates of roughly mm size. Photophoresis has been proposed to play an important role in the evolution and physics of protoplanetary discs (Krauss Wurm 2005, Wurm Krauss 2006, Herrmann 2007). Theory of ideal particles predicts (e.g. Beresnev 1993) that dust embedded in a gaseous disc is, in the presence of a radiation field, subject to photophoresis, which causes the dust particles to move away from the light source. Here we present results from microgravity experiments to determine the influence and strength of photophoresis on protoplanetary dust aggregates. The experiments were carried out in the context of ESA's IPE project (ICAPS pre-cursor experiment) during drop tower and parabolic flight campaigns and compare these results to the existing theory. We will also give a brief overview of the planned IPE facility on the ISS and an outlook on how it will utilize the photophoretic effect to increase the prospective science output. IPE will certainly extend the experimental boundaries with respect to the understanding of aggregate growth and physical properties of dust aggregates in the micrometer to millimeter range.