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(POS-13) COMPACT: a new complex plasma facility for the International Space Station

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Complex plasmas are made of micrometer-sized particles immersed in a weakly ionized gas. Due to their interactions with the surrounding ions and electrons, the microparticles usually acquire negative charges of the order of several thousand elementary charges. Due to microparticles interactions, complex plasmas can form gaseous, liquid and crystalline states. For this reason, they are often used as model systems for soft matter. Thanks to their large size, a direct optical observation of individual particles is possible and enables the study of their dynamics at the kinetic level even in systems where the number of particles is large. In ground-based experiments, gravity is the dominant force restricting the research to vertically compressed, inhomogeneous microparticle clouds, or (quasi) two-dimensional systems, and masking dynamical processes mediated by weaker forces. Under reduced gravity conditions, such as provided on the International Space Station (ISS), this limitations are overcome allowing the study of processes otherwise mask by gravity. In this poster, the research goals for the next generation complex plasma facility COMPACT to be operated onboard the ISS are presented. COMPACT is envisaged as an international multi-purpose and multi-user facility that gives access to the full three-dimensional kinetic properties of the particles.

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plasma

Keyword-2

microparticles

Keyword-3

microgravity

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