Plenary Talk PV VIII Thu 9:00 E415

Highly charged helium droplets — •Paul Scheier — Institut für Ionenphysik und Angewandte Physik, Universität Innsbruck, Technikerstr. 25, A-6020 Innsbruck, Austria

Helium nanodroplets provide an inert matrix, free of walls with outstanding properties to grow complexes and clusters at sub-Kelvin temperatures. However, like for almost every existing method of cluster and nanoparticle formation pickup into neutral helium droplets leads to a wide distribution of dopant cluster sizes. Recently, we discovered that large helium droplets can become highly-charged. Micrometer sized droplets can reach charge states up to several 100. The charge centers self-organize as two-dimensional Wigner crystals at the surface of the droplets and act as seeds for the growth of dopant clusters. Cluster ions of a specific size and composition can be formed by this technique with unprecedented efficiency. Soft-landing of dopant clusters formed in highly-charged helium droplets can be achieved via collisions with a surface set on a retarding potential. Due to the fact that several hundred nanoparticles are formed simultaneously in one helium droplet and the suppression of splashing, the deposition time compared to neutral helium droplets can be reduced by more than two orders of magnitude.