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Submicron dust clouds for optical charge measurements ANDRE MELZER, HARALD KRGER, University Greifswald, CARSTEN KILLER, Max-Planck-Institute for Plasma Physics — Dusty plasmas consist of particles immersed in gaseous plasmas. The charge of the dust particles that they attain due to the inflow of plasma electrons and ions is a pivotal parameter: the particle charge determines the interaction with the plasma species and among the particles themselves. So far, charge measurements exploit the dust-plasma interaction or the analysis of wave-motion of the particles. Recently, a completely different, optical approach has been suggested, where the charge is extracted from the wavelength shift of the optical phonon resonance due to the charge-modified polarizability of the material. This "detuning" of the phonon resonance increases with particle charge and is prominent for nanometer-sized particles. In first experiments, we demonstrate the trapping of nanometric dust particles made of Al_2O_3. The dust is injected by a gas stream into the plasma. Clouds of particles with diameters around 100 nm can be trapped in the bulk plasma of the discharge. There, the phonon resonance of Al_2O_3 is measured in-situ in an FTIR spectrometer.

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