

Structure and melting of 3D anisotropic dust crystals in dc glow discharges

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Special method of triaxial recognition of dusty structures and experimental investigation of melting of anisotropic dusty plasma crystals is presented. Structure was formed in DC glow discharge under 0.51 Tor neon pressure and different discharge currents from 3 to 10 mA. and observed with two timely and spatially synchronized CCD videocamers 720×540 pixels 25fps. From obtained video data 3D coordinates and velocities was recognized by using special software. As a result three dimensional trajectories with subpixel accuracy ($\pm 1.5\mu\text{m}$) were recognized. It allowed obtaining pair correlation functions, mass transfer evaluation functions, kinetic temperature, diffusion coefficient, and concentration depending on time.