VISCOELASTICITY OF 2D DUSTY PLASMAS*

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In glow discharge plasmas, a suspension of dust particles can self-organize in a lattice structure, forming so called dusty plasma. The lattice structure is either solid or liquid-like, determined by plasma conditions.

Depending on the lattice structure, viscoelasticity is the property of materials that exhibit both viscous and elastic characteristics. Most materials are viscoelastic; they both store and dissipate energy, with the relative proportions depending on frequency. So, the frequency-dependent viscosity, $\eta(\omega)$, is often used for the investigation of viscoelasticity. Besides $\eta(\omega)$, the wave vector dependent viscosity, $\eta(k)$, is also used to study the viscoelastic character at different length scales.

Motivated by two-dimensional (2D) dusty plasma experiments, we performed Langevin dynamical simulations to study the viscoelasticity of 2D dusty plasmas. In different conditions, both $\eta(\omega)$ and $\eta(k)$ are calculated and compared.

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