

Numerical study of structural and dynamical properties of dust particles chain structures in a flowing plasma environment

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The formation of dust particles into chain structures in a flowing plasma environment is a well-known phenomenon that is inherent in the experimental conditions typical for RF or DC discharge plasma. The structural and dynamical properties of the chains being formed are inextricably linked with the surrounding plasma media. Due to the high complexity of the interdependence between dust and plasma parameters, analytical approaches can hardly be applied to the description of such systems and numerical ones should be incorporated. Numerical calculation of flowing plasma around dust particles which considers self-consistent charging is resource very intensive task and highly optimized codes should be used. We have developed the fast GPU-based code, OpenDust, for the self-consistent calculation of forces, acting on dust particles, immersed in a plasma-flowing environment. Here, we incorporate OpenDust to study various structural and dynamical properties of dust particle chain structures. We compare the results with previous calculations and experiments.