Contribution ID: **1407**   Type: **Oral**

DYNAMICAL PROPERTIES OF DUST PARTICLE CHAIN STRUCTURES STUDY USING NUMERICAL SIMULATION

Tuesday 31 October 2023 15:30 (15 minutes)

The formation of dust particles into chain structures in a flowing plasma environment is a well-known phenomenon which is inherent for the experimental conditions typical for RF or DC discharge plasma [1]. 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 a very resource intensive task and highly optimized codes should be used. Previously, we have developed the fast GPU-based code, OpenDust [2], for the self- consistent calculation of forces, acting on dust particles, immersed in a plasma-flowing environment and dust particles charges. Here, we incorporate OpenDust to study various structural and dynamical properties of dust particle chain structures simultaneously calculating dust and plasma dynamics. Typical view of a dust particles chain structure during the simulation is presented in the Figure 1.

References

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Session Classification: Mathematical Modeling and Computational Physics

Track Classification: Mathematical Modeling and Computational Physics