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**PIC-MCC study of particle charging in a collisional flowing plasma**[1] BENIAMINO ROVAGNATI, MOHAMMAD DAVOUDABADI, University of Illinois at Chicago, GIOVANNI LAPENTA, Katholieke Universiteit Leuven, Celestijnenlaan, Belgium, and Los Alamos National Laboratory, FARZAD MASHAYEK, University of Illinois at Chicago — In the framework of both dusty plasmas and material processing technologies for nanoparticles such as Plasma Enhanced Chemical Vapor Deposition (PECVD), the charging process of a single grain is one of the most important and most studied phenomena. It determines the particle interactions with plasma electrons and ions, with electromagnetic fields, between the particles themselves, and strongly relates to the particle coating growth rate in PECVD processes. In the present study, we model the charging phenomenon of a single particle which is immersed in a collisional flowing plasma via Particle-In-Cell (PIC) method. Both ions and electrons are fully tracked as computational particles and collisional charge-exchange process is accounted for by use of the Collisional Monte Carlo (MCC) approach. We consider a particle radius of the order of the electron Debye length. Particle potential, plasma species distributions and ion drag force are calculated under different operating conditions, such as plasma density and plasma drift velocities.

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