

# A PARTICLE-IN-CELL CODE FOR THE SIMULATION OF QUASI COLLISIONLESS SPACE PLASMA

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## **Abstract:**

Solar wind near the Earth is an unique laboratory to study the physics of space plasma. This quasi neutral -and collisionless environment can be described from a considerable number of approaches, which are related to the scales present on this highly complex medium [ref. Bruno-Carbone]. In the low-scales regime, a kinetic approach follows the behavior of ions and electrons by a coupled Vlasov-Maxwell system of equations for each of these species. We use this approach to implementing a full-kinetic Particle-in-Cell code [ref. Markidis] in the HPC server of the Departamento de Física of Escuela Politécnica Nacional. Our study develops analytically and numerically the stream instability, in the well-known limit cases of beam-plasma and gentle-bump. We present here these results, together with computing-time tests that supports the stability of our implementation, which would strengthen the computational infrastructure of the region.

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**References:** Bruno-Carbone], Markidis, Lapenta, Valentini, Krall

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