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2D radial-azimuthal Particle-In-Cell benchmark for ExB discharges WILLCA VILLAFANA, CERFACS / Safran Aircraft Engines, ANNE BOURDON, PASCAL CHABERT, Laboratoire de Physique de Plasmas, BENEDICTE CUENOT, CERFACS, KEN HARA, Stanford University, MARILYN JIMENEZ, University of Saskatchewan, FEDERICO PETRONIO, Laboratoire de Physique de Plasmas, ANDREI SMOLYAKOV, University of Saskatchewan, FRANCESCO TACCOGNA, CNR, ANTOINE TAVANT, Laboratoire de Physique de Plasmas, OLIVIER VERMOREL, CERFACS — Plasma applications require a deep understanding of the complex interactions of particles with walls. In the example of ExB devices, such interactions can be greatly altered by the magnetic field. While ions are immune to it, electrons are strongly magnetized, which can trigger the development of a variety of coupled instabilities. The latter can dramatically increase electronic temperatures, that could be an issue near the walls. Such intricate physics may be studied with simulation, in particular with Particle-In-Cell (PIC) methods which are robust and accurate. Unfortunately, there is no theoretical reference to validate the results. To give confidence in the numerical solution, code comparison is proposed. Thus, in this work five groups using independent PIC codes joined their efforts to carefully set up step by step a 2D radial-azimuthal simulation. Along this incremental process, mean parameters and characteristic instabilities have been systematically compared and were found similar. Results may be then used by the community for code benchmarking. This work is part of the Landmark project and complements previous 2D axial-azimuthal studies.

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