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Magnetic flux coordinates for axisymmetric magnetically enhanced discharges[1] DENNIS KRUEGER, RALF PETER BRINKMANN, Ruhr University Bochum — For describing the intrinsically complicated dynamics of a charged particle in the presence of a magnetic field, magnetic flux coordinates are a well established framework, being successfully used in fusion research and astrophysics. For the application in technological plasmas, however, important amendments have to be made. Especially the incorporation of domain boundaries is a crucial point because magnetic field lines might intentionally intersect with those. Therefore, in this work we present a system of field aligned coordinates (ψ, θ, s) considering this peculiar requirement. At the present stage, it is especially suited for an axisymmetric magnetic field setup, which can be found e.g. in circular magnetrons and consists of the magnetic flux value ψ, the azimuth angle θ, and the arc length parameter s. The first two select a specific field line and the last one describes a certain location onto it. As a first application of the extended framework, we present confinement times of highly energetic electrons within a high power impulse magnetron sputtering (HiPIMS) discharge. The solution of an eigenvalue problem based on a linear kinetic model is compared to insights obtained with a 3d single particle MCC (Monte Carlo Collision) simulation.

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