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HECTOR: A code for the study of charged particles in axisymmetric tokamak plasmas.

(English) [Zbl 0766.76081](#)

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Summary: A new charged particle orbit following code HECTOR is described. The code simulates the behaviour of thermal particles and high energy particles, such as those resulting from the ICRF wave field interactions or from thermonuclear reactions within the confining magnetic fields of non-circular axisymmetric tokamak plasmas. The particle trajectories are traced using a new, fast, and efficient hybrid orbit-following scheme, based upon the drift equations in the guiding centre approximation and the constants of motion. The Monte Carlo technique is used to describe the Coulomb scattering processes of dynamical friction, pitch angle scattering, energy diffusion and the ICRF interaction processes. The code is specifically designed to operate within the experimental environment.

MSC:

76M35 Stochastic analysis applied to problems in fluid mechanics

76X05 Ionized gas flow in electromagnetic fields; plasmic flow

65C05 Monte Carlo methods

78A35 Motion of charged particles

Keywords:

ICRF wave field interactions; thermonuclear reactions; confining magnetic fields; hybrid orbit-following scheme; drift equations; Coulomb scattering processes; pitch angle scattering; energy diffusion

Software:

[HECTOR](#)

Full Text: [DOI](#)