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Particle, momentum and energy conserving Monte Carlo model for ion transport JES CHRISTIANSEN, JACK CONNOR, Euratom/UKAEA Fusion Association — A Monte Carlo model based on guiding centre drift motion and Coulomb collisions has been developed to study collisional ion transport in an axisymmetric tokamak equilibrium. The model features momentum conservation for test particles colliding with the background plasma. Calculations have shown an 8% particle loss rate during an energy confinement time. The Monte Carlo model has been extended with a recycling scheme in order to conserve particles and plasma energy. Recycling of lost particles occurs as neutrals from either a limiter or the SOL. Conservation of energy is enforced by an ad hoc prescription which assigns the lost particle energy E to the next particle in increments E/100000 per step of motion. This prescription is meant to simulate energy gained by the electrons from the axial electric field. Extensive calculations are made to study the resulting density and temperature profiles; these are accumulated from the Monte Carlo test particle motions. The profiles will be compared with the assumed profiles of the background plasma to establish self-consistency.

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