# Collisional transport across the magnetic field in drift-fluid models - DTU Orbit (09/11/2017)

## Collisional transport across the magnetic field in drift-fluid models

Drift ordered fluid models are widely applied in studies of low-frequency turbulence in the edge and scrape-off layer regions of magnetically confined plasmas. Here, we show how collisional transport across the magnetic field is self-consistently incorporated into drift-fluid models without altering the drift-fluid energy integral. We demonstrate that the inclusion of collisional transport in drift-fluid models gives rise to diffusion of particle density, momentum, and pressures in drift-fluid turbulence models and, thereby, obviates the customary use of artificial diffusion in turbulence simulations. We further derive a computationally efficient, two-dimensional model, which can be time integrated for several turbulence de-correlation times using only limited computational resources. The model describes interchange turbulence in a two-dimensional plane perpendicular to the magnetic field located at the outboard midplane of a tokamak. The model domain has two regions modeling open and closed field lines. The model employs a computational expedient model for collisional transport. Numerical simulations show good agreement between the full and the simplified model for collisional transport.

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