Abstract Submitted
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Investigation of the Effect of Collisionality on Scrape Off Layer Filaments using Three Dimensional Simulations[1] LUKE EASY, The University of York, FULVIO MILITELLO, JOHN OMOTANI, NICK WALKDEN, Culham Centre for Fusion Energy, BEN DUDSON, The University of York — The propagation of filaments in the Scrape Off Layer (SOL) of tokamaks largely determines the plasma profiles in this region. Reactor relevant conditions will require interactions between neutrals and plasma in the divertor region to mitigate heat loads and sputtering. This is expected to increase the resistance to parallel currents in the SOL, and thus influence filament transport. 3D simulations have been used to study the influence of enhanced parallel resistivity on the dynamics of filaments. Filaments with the smallest perpendicular length scales, which were inertially limited at low resistivity (meaning that polarization rather than parallel currents determine their radial velocities), were unaffected by resistivity. For larger filaments, faster velocities were produced at higher resistivities, due to two mechanisms. Firstly parallel currents were reduced and polarization currents were enhanced, meaning that the inertial regime extended to larger filaments, and secondly a potential difference formed along the parallel direction so that higher potentials were produced in the region of the filament for the same amount of current to flow into the sheath. These results indicate that broader SOL profiles could be produced at higher resistivities.

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