Abstract Submitted
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Reconstructing NBI-driven rotation profiles with the local gyrokinetic code GS2[1] N. CHRISTEN, University of Oxford, M. BARNES, Univeristy of Oxford, H. WEISEN, EPFL, P. SIREN, Aalto University and VTT — Neutral beam injection (NBI) is used in tokamaks as a heating mechanism and as a drive for toroidal rotation. Previous work established that sheared toroidal flows, such as those produced by NBI, can substantially affect radial turbulent transport [2] [3]. Larger experiments like ITER are expected to rely on NBI operating at higher energies, which implies additional engineering challenges, and a lower ratio of torque to beam power. However, there is little work based on first principles to quantify how such beams affect transport. We present a procedure giving insights on how NBI determines the plasma rotation. This method hinges on local, delta-f gyrokinetic simulations, with a novel algorithm for flow shear implemented in the GS2 code [4]. We validate our approach against experiments carried out at the JET facility. Our simulations show that linear instabilities in the presence of flow shear can change significantly when radial wavelengths (typically of the order of the ion gyroradius) also include electron gyroradius scales.

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