

Abstract Submitted  
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**Core-Edge Coupled Modeling for Fast Ion Transport**<sup>1</sup> XIN ZHANG, Princeton University, FRANCESCA POLI, Princeton Plasma Physics Lab — Fast particles in tokamak experiments have large drift orbits that frequently extend into the Scrape-Off-Layer (SOL). The confinement of these particles are therefore influenced by the SOL, which subsequently impacts the overall heating and confinement of the core plasma. In order to study the effect of SOL on fast particle confinement, we have developed a full orbit fast ion tracer code that samples the entire tokamak plasma. The code uses a reduced SOL model and fast grid generator to provide a time-dependent plasma background for the SOL, whereas the core plasma profiles are provided by TRANSP. The particle motions are integrated with the Boris algorithm, with collisions against the thermal plasma modeled by the Langevin equation for Coulomb collisions and solved with a newly developed energy conserving algorithm [Zhang, Fu, and Qin, arXiv:2006.10877]. The coupled evolution of the plasma can therefore be studied self-consistently, which could provide valuable insights into existing experiments and aim future experimental design. The simulations will be performed using NSTX/NSTX-U plasma profiles.

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