

Abstract Submitted
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Measurements of classical fast ion confinement with fusion product diagnostics RICHARD MAGEE, RYAN CLARY, SERGEY KOREPANOV, ARTEM SMIRNOV, EUSEBIO GARATE, IAN ALLFREY, TRAVIS VALENTINE, Tri Alpha Energy, Inc., Rancho Santa Margarita, CA 92688, USA, THE TAE TEAM — Neutral beam injected fast ions play a critical role in the C-2 field reversed configuration plasma,¹ helping to sustain magnetic flux against resistive decay and heating the plasma via Coulomb collisions. The fast ions are well confined; due to the relatively low magnetic field strength the fast ions have large, machine-size orbits that permit them to average over otherwise deleterious fluctuations. These same orbits however, have large radial excursions that result in greater interaction of fast ions with edge neutrals and a greater potential for charge exchange losses. In this presentation, the fast ion slowing down time is determined from the decay in neutron flux following beam termination. It is found that the slowing down scaling is close to classical (i.e., $\tau \sim T_e^{3/2}/n_e$) and that charge exchange losses are only significant for ions with 1.5x the nominal injection energy. We will also present initial data from a newly installed proton detector, which complements the temporal resolution of the neutron detector with spatial resolution. The detector will be used to diagnose the axial profile of confined fast ions.

¹M. Tuszewski et al., Phys. Rev. Lett. **108**, 255008 (2012).

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