

Abstract Submitted
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Approaches to Alpha Knock-On Tail Measurements on ITER,¹

R.K. FISHER, General Atomics — Possible approaches to measuring the energetic DT neutron tail resulting from collisions between confined alphas and plasma fuel ions are discussed. Knock-on measurements on ITER require neutron detectors with both sufficient detection efficiency and energy resolution to measure the small fraction ($\sim 10^{-4}$ to 10^{-3}) of DT neutrons in the alpha collision-induced tail. The use of neutron activation detectors with energy thresholds above 15.5 MeV appears attractive if radiochemistry techniques can be employed to reduce the background decays from impurities or competing neutron-induced reactions in the activation targets. The use of bubble detectors with neutron energy thresholds between 15 and 20 MeV is being re-examined in light of the recent development of gel bubble detectors with higher detection efficiency and a reduced chance of the problematic below-threshold response observed in our earlier experiments. The use of proton recoil tracks produced by neutron collisions in nuclear emulsions or in track etch detectors is also discussed.

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