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**Single-Gas Bubble Neutron Detectors for Alpha
Knock-On Tail Measurements**¹

R.K. FISHER, P.B. PARKS, General Atomics, A. BELIAN, E. MORSE, University of California, Berkeley — Measurement of the neutron energy spectrum above ~ 16 MeV will yield information on the spatial and energy distributions of confined fast alphas in DT tokamaks. Standard two-gas bubble neutron detectors, designed to only detect neutrons with energies above a selectable threshold determined by the gas mixture, were used in preliminary attempts to measure the knock-on neutrons from DT plasmas in TFTR and JET. Subsequent measurements at accelerator neutron sources showed an unexpected below-threshold detector response that prevented observations of the alpha-induced neutron tails. Spontaneous bubble nucleation measurements show that this below-threshold response is due to slight variations in the gas mixture, and is not present in single-gas detectors. Single-gas detectors will be tested at Ohio University and at UC Berkeley to determine the neutron energy threshold as a function of detector operating temperature, and to confirm the lack of a below-threshold response. An array of single-gas detectors operating at different temperatures should allow measurements of the alpha knock-on neutron tail during the planned DTE2 experiments on JET.

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Prefer Oral Session
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