Abstract Submitted for the Thirteenth Topical Conference on High Temperature Plasma Diagnostics June 18–22, 2000, Tucson, Arizona

[ ] Theory [x] Experiment

Measured Response of Bubble Neutron Detectors and Prospects for Alpha Knock-On Diagnostics* R.K. Fisher, A. Belian,† M.L. Loughlin,+ J. Liptac,** S. Medley,# E. Morse,† P.B. Parks, and A.L. Roquemore,# *General Atomics* — 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.[1] The energetic neutrons result from fusion reactions involving the energetic ions created by alpha-fuel ion knock-on collisions. 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 the majority of 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 UC Berkeley to determine the neutron energy threshold as a function of detector operating temperature and to confirm their suitability for alpha knock-on tail measurements. An array of single-gas detectors operating at different temperatures should allow measurements of the alpha knock-on neutron tail during the proposed DTE2 experiments on JET.

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[1]R.K. Fisher, P.B. Parks, J.M. McChesney and M.N. Rosenbluth, "Fast Alpha Particle Diagnostics Using Knock-On Ion Tails", Nuclear Fusion **34**, 1291 (1994).

[x] Prefer Poster Session

[ ] Prefer Oral Session

[ ] No Preference

[ ] This poster/oral should be placed in the following grouping: (specify order)

[ ] Special Facilities Requested (e.g., movie projector)
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[ ] Other Special Requests
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Submitted by:

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