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Category Number and Subject: 5.5.0. ITER and Magnetic Fusion  
Development

Theory     Experiment

**Fusion Development Facility Mission,\*** R.D. Stambaugh, V.S. Chan, A. Garofalo, J. Smith, and C.P.C. Wong, *GA* – A Fusion Development Facility (FDF) is proposed to fill the gaps between ITER and current experiments and a fusion demonstration power plant (DEMO). FDF should carry forward Advanced Tokamak physics and enable development of fusion's energy applications. Near term advanced tokamak physics will be used to achieve steady-state with burn, producing 100-250 MW fusion power with modest energy gain ( $Q < 5$ ) in a modest sized device (between DIII-D and JET). FDF will further develop all elements of AT physics for an advanced performance DEMO. With neutron flux at the outboard midplane of 1-2 MW/m<sup>2</sup>, continuous operation for periods up to two weeks, and a goal of a duty factor of 0.3 on a year, FDF can produce fluences of 3-6 MW-yr/m<sup>2</sup> in ten years of operation. The development of blankets suitable for tritium, electricity, and hydrogen production will be done in port modules. The most promising candidates will be deployed as full blankets in FDF. FDF will have a goal of demonstrating closure of the fusion fuel cycle, producing its own tritium. FDF, ITER, IFMIF, and other AT devices will provide the basis for a fusion DEMO power plant of the ARIES-AT type.

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