Abstract Submitted
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Driven Edge Plasma in Axisymmetric Tandem Mirror ARTHUR MOLVIK, Retired — The cylindrical symmetry of axisymmetric tandem mirrors (once proven MHD stable[1]) eliminates neo-classical radial transport, simplifies the engineering of power plants, and could reduce the need for fusion-materials development with rotating ∼1 m thick-liquid walls to absorb neutron energy and breed tritium.[2] It avoids tokamak issues of disruptions and high diverter power density. However, the burning-plasma core must be shielded from gas and vapor from the liquid walls. We propose driving an edge-plasma layer that is thick enough to ionize gas and vapor and carry it to the end walls where it will be pumped. Potential drivers include ion cyclotron, lower hybrid, or low-energy neutral beam injection (NBI) to supplement radial energy transport from the core. Here, we evaluate 0.2 to 20 keV NBI. We discuss the particle and power balance of the edge plasma, possible impacts of radial transport on the required edge-plasma line density Vs central-cell plasma length, equilibration of T_e with T_i, and beam divergence, all as a function of deuteron (or DT) beam energy.

[1]D.D. Ryutov, et al., Phys. Plasmas **18**, 092301 (2011).
[2]R. W. Moir and R. D. Rognlien, Fusion Sci. and Tech. **52**, 408 (2007).

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