Abstract Submitted
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Thermoelectric Rotating Torus (TROT): A Concept for Fusion A. HASSAM, University of Maryland — The plasma thermoelectric effect (Braginskii, Sakharov) arises because of the $1/v^3$ dependence of the collision operator and drives a B x grad[T] current in a magnetized plasma. This current can maintain a magnetic field in steady state against resistive diffusion if the central electron temperature is maintained by auxiliary heating. The effect is akin to the bootstrap current and is best realized in the creation of a steady state Z-pinch plasma. A Z-pinch is, of course, MHD unstable but a toroidal Z-pinch made to rotate toroidally at supersonic speeds can be made both steady state and stable. This is the idea behind the TROT. The system has two novel advantages: (1) there are practically no major coil systems needed (all the field is internally generated); and (2) there is no technological limit to B, and hence to density (the thermoelectric effect can be used to even pump up an initially weak magnetic field). The overarching questions are: (a) is the effect realizable experimentally and (b) what is an appropriate rotation drive for an initial small experiment? A novel rotation drive is presented elsewhere at this meeting (R. Reid, et al).

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