Abstract Submitted
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A Novel Means for Nuclear Fusion. DAVID W. KRAFT, University of Bridgeport — Since Tokamak devices require temperatures of the order of 10^8 K for their operation, it is tempting to assume that appreciable nuclear fusion rates can be attained only at such high temperatures. However it may not be widely appreciated that fusion rates are proportional to the square of the particle density and that these temperature requirements result from use of relatively thin plasmas. We describe herein means to achieve high fusion rates at temperatures of only a few million K. Specifically we consider the compression by an explosively-driven piston of a dense plasma with reduced degrees of freedom such as may be effected by an electric discharge or by application of magnetic fields. Model calculations of the temperature increase employ one mole of deuterium initially at room temperature and pressure and assume an ideal gas undergoing a reversible adiabatic compression. The energy release computed for primary fusion reactions is compared with the work to compress the gas. Refinements of the basic calculations include consideration of secondary fusion reactions, non-ideal gas behavior and an irreversible adiabatic compression.

David W. Kraft
University of Bridgeport

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