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Non-Maxwellian distributions in an IEC device for fusion break even EVSTATI EVSTATIEV, LANL — We explore the effect of non-Maxwellian distributions on the maximum sustainable ion density in the core of an Inertial Electrostatic Confinement (IEC) device. Ref. 1 considered a negative potential well created by injecting radially monoenergetic electrons. It showed that potential well of 100 KV can be sustained with about 100 A of total injection current. Then Ref. 1 showed that purely monoenergetic, radially moving ions cannot be trapped in a well so created. On the other hand, Maxwellian radial ions can be trapped but there is an upper limit on the core ion density, n_0. If break even balance of fusion yield/ injected (electron) power is considered, this limitation translates into a required electron injection current of the order of 10^{14} A. Clearly, this number is impractical. Natural questions arise from the calculations presented in Ref. 1: Is it possible to find a non-Maxwellian ion distribution (sustainable by some means) such that the necessary electron injection current for creating a trapping potential can be lowered to reasonable numbers? If yes, is such ion distribution energetically viable for fusion break even? Ongoing work indicates positive answer to the first question. We will discuss the energetics of such scheme.

[1] W. C. Elmore, J. L. Tuck, K. M. Watson, Phys. Fluids, vol. 2, 239 (1959).

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