Abstract Submitted
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Novel Condensed Matter Cluster High Reaction Rate ICF Target[1] GEORGE MILEY, University of Illinois — Recent research has developed a technique for imbedding high density condensed matter deuterium "clusters" (50-100 atoms per cluster) in various metals such as Palladium (Pd), Boron (B) and Lithium (Li) [1]. Experiments have shown that these condensed matter clusters approach metallic conditions, exhibiting super conducting properties. An ICF target is proposed where a central core is designed with a material containing these clusters. A conventional ablator-tamper surrounds the core. Preliminary computations indicate that a large percentage of the clusters should reach compressed densities exceeding that of conventional cryogenically-fueled deuterium targets. The reaction rate from the compressed clusters then becomes very high while the total yield depends upon the cluster packing fraction achieved. Such a target potentially offers higher reaction rates and higher fractional burns than possible with conventional targets. Key issues under study are whether adequate cluster density per unit volume can be fabricated in the target core, cluster stability during compression, and radiation losses due to the high Z. [1] G. H. Miley, "Novel High Performance Cluster Type ICF Target", DOE ICC Workshop, Reno NV, June 2008.

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