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IFE/P6-19: Mass-Fabrication of Targets for Inertial Fusion Energy

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The ability to economically fabricate large quantities of targets is a key feasibility issue for inertial fusion energy. There exist numerous targets designs in support of various concepts for inertial fusion energy power plants. Common to all is the need to fabricate numerous targets to supply the plant. Most (but not all) plants also require targets to be injected rather than placed into a reactor chamber where the driver meets the targets. Targets can be as simple as a capsule to contain DT fuel. However, many targets are an assembly of parts. The tolerance required of parts and assemblies is high. General Atomics is developing technologies for IFE target production and injection. We report on the development of production methods for hohlraums, and P2 shields. A robot target assembly station was built and we discuss its ability to build high tolerance target assemblies. A six degree of freedom ballistics code was implemented to model the trajectory of targets injected into an IFE target chamber. We use this model to examine issues affecting the accuracy of the injection of the target, including the tolerance with which targets are assembled and the effect of gas in the chamber. This work supported by General Atomics internal funding.

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