

Abstract Submitted  
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**Electrostatic Focusing Lens** ERIC THOMAS, DEMITRI HOPKINS

— We developed an electrostatic focusing lens capable of generating DD reactions, by focusing deuterium ions generated from a pointed emitter at a frozen heavy water target. Due to difficulty with the pointed emitter, we later switched to a hollow cathode design. To model the lenses, chamber, and calculate the dimensions for the design that would maximize ion energy and density, the program SIMION was used. During stable operation, vacuum was hand adjusted around 10-13 mTorr. To keep stable beam, DC voltage generator was varied between 15-25kV. Hand adjusting was necessary, because at points in the operation the frozen heavy water would release vapor at an increased rate. This caused the pressure to rise and the beam current to spike, creating instabilities and an arc to the lens. Three methods were used to determine successful DD production. (1) Two differently shielded Geiger counters (unshielded and UHMW-PE insulated tube), (2) Spectrophotometer comparing control peaks with heavy water tests, and (3) a calibrated bubble dosimeter specific to neutrons. Analysis of the results suggest the neutrons flux varied from 532 to  $1.4 \times 10^6$  neutrons/ sec, and require further tests to plot and narrow results.

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