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Time-Resolved Tandem Faraday Cup for High Energy TNSA Particles STEPHEN PADALINO, ANGELA SIMONE, ETHAN TURNER, MARY KATE GINNANE, NATALIE DUBOIS, State University of New York at Geneseo, CRAIG SANGSTER, SEAN REGAN, Laboratory for Laser Energetics — MTW and OMEGA EP Lasers at LLE utilize ultra-intense laser light to produce bursts of high-energy ions through Target Normal Sheath Acceleration (TNSA). A Time Resolved Tandem Faraday Cup (TFC) is being designed to collect and differentiate protons and alphas from heavy ions produced during TNSA. The TFC will be comprised of a replaceable thickness absorber capable of stopping a range of user-selectable heavy ions. Ions heavier than alphas emitted from the TNSA plasma will stop within the primary TFC, while less massive particles will continue through and deposit their remaining charge in the secondary TFC. The time-resolved beam current generated in each cup will be measured on a fast storage scope in multiple channels. Secondary electrons released from the impact of heavy ions with the cups will be suppressed by magnetic and electrostatic fields. A charge-exchange foil at the TFC entrance will modify the charge state distribution of the heavy ions produced by the plasma to a known distribution. Using the known distribution and the time of flight of the heavy ions, the total heavy ion current can be determined. Ultimately the TFC will be used to normalize a variety of nuclear physics cross sections and stopping power measurements. Funded in part by a LLE contract through the DOE.

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