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Studying Plasma Screening Effects with ^{10}B(p,α)^{7}Be

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Laboratory measurements where an accelerator impinges on a solid target of neutral charge differ intrinsically from reactions that take place in an ionized stellar plasma environment.
Particularly relevant for nuclear astrophysics at stellar energies, electron screening effects lower the Coulomb barrier and thus enhance measured thermonuclear reaction rates. The ^{10}B(p,α)^{7}Be reaction is a unique candidate for studying how electron screening influences the plasma environment reaction rate in comparison to the unscreened laboratory environment. An experiment is being developed to measure the reaction rate in a plasma environment at the National Ignition Facility (NIF) by measuring the production of ^{7}Be. However, the current laboratory data available on this reaction is uncertain and incomplete. In order to better constrain the cross section, an experiment was performed at the Edwards Accelerator Laboratory at Ohio University where measuring the energy and time-of-flight of reaction products allows clean identification of the reaction yield. Results from this experiment will be presented in this talk. These cross sections will be incorporated in a new R-Matrix analysis to better constrain the low energy extrapolation of this reaction.

Primary author: Mr VANDE KOLK, Bryant (University of Notre Dame)

Co-authors: Dr VOINOV, Alexander (Ohio University); Dr BOELTZIG, Axel (University of Notre Dame); Dr BRUNE, Carl (Ohio University); Dr MACON, Kevin (University of Notre Dame); Dr WIESCHER, Michael (University of Notre Dame); Dr O'MALLEY, Patrick (University of Notre Dame); Dr DEBOER, Richard J. (University of Notre Dame); Dr MASSEY, Thomas (Ohio University)

Presenter: Mr VANDE KOLK, Bryant (University of Notre Dame)

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