

HTPD 2018



Contribution ID : 347

Type : not specified

8.48 Design of a CR-39 Based Compact DD Neutron Spectrometer for Measuring Yield, Ion Temperature, and Areal Density on the Z

Tuesday, 17 April 2018 16:01 (120)

A compact neutron spectrometer, based on a CH foil for production of recoil protons and CR-39 detection, is being developed for measurements of DD-neutron spectra at Z. To accurately measure the DD ion temperature (T_{ion}) of ~ 2 keV, the spectrometer must have an energy resolution (FWHM) of ~ 120 keV. Spectral broadening is primarily dominated by the finite thickness of the converter foil and track-diameter variations in the CR-39. To infer an areal density (ρR) background levels from neutron induced tracks need to be sufficiently low to measure the down scattered DD neutrons. This is done through a combination of shielding and the Coincidence Counting Technique (CCT) [1]. The spectrum itself is inferred from the track diameter distribution measured on the CR-39 detector. To this end, a novel analysis technique has been developed for determining the energy-diameter relationship required to recover the spectrum. Initial data from a crude prototype spectrometer has been collected from a few MagLIF shots at the Z facility. This work is supported by Sandia under DOE contract DE-NA0003525.

1) D. T. Casey et al. RSI 82, 073502 (2011)

Primary author(s) : LAHMANN, Brandon (MIT Plasma Science and Fusion Center)

Co-author(s) : GATU-JOHNSON, Maria (MIT Plasma Science and Fusion Center); FRENJE, Johan (MIT Plasma Science and Fusion Center); SEGUIN, Fredrick (MIT Plasma Science and Fusion Center); PETRASSO, Richard (MIT Plasma Science and Fusion Center); HAHN, Kelly (Sandia National Laboratories); JONES, Brent (Sandia National Laboratories)

Presenter(s) : LAHMANN, Brandon (MIT Plasma Science and Fusion Center); GATU-JOHNSON, Maria (MIT Plasma Science and Fusion Center); FRENJE, Johan (MIT Plasma Science and Fusion Center); SEGUIN, Fredrick (MIT Plasma Science and Fusion Center); PETRASSO, Richard (MIT Plasma Science and Fusion Center); HAHN, Kelly (Sandia National Laboratories); JONES, Brent (Sandia National Laboratories)

Session Classification : Session #8, Tuesday Afternoon Poster Session