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# 8.33 Signal-to-background ratio of a Thin foil Proton Recoil neutron spectrometer at ITER

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The Thin foil Proton Recoil spectrometer (TPR) concept has previously been used at JET as a DT fusion neutron diagnostic. It is also one of the techniques suggested for use at ITER as part of the high resolution neutron spectrometer system. The main purpose of the neutron spectrometers at ITER is to determine the fuel ion density ratio in DT plasmas. The TPR principle is based on the detection of recoil protons produced due to (n,p) elastic neutron scattering in a thin CH foil. Some of the produced protons will interact in a dedicated detector. For the suggested high resolution neutron spectrometer system at ITER, the TPR proton detector is based on the dE-E principle. In this study, the dE-E capability of a silicon detector system has been experimentally investigated using mono-energetic proton beams. The measurement was conducted at the Uppsala University TANDEM accelerator using proton beam energies of 3 – 8 MeV for proof of concept. The experimentally obtained results together with Monte-Carlo background simulations are used to estimate the expected signal-to-background ratio for a TPR system during DT operations in ITER.

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