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Unfolding the fast neutron fluence energy distribution of a NE230 deuterated liquid scintillator detector using the MAXED code

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Abstract content
   (Max 300 words)
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Detailed knowledge of the neutron energy spectra is useful in basic research and applications. The overall procedure of measuring and unfolding the fast neutron fluence energy distribution with a NE230 deuterated liquid scintillator detector is described. The recoil deuteron pulse height distribution in air of a neutron beam of energy up to ˜ 50 MeV produced by a 66 MeV proton beam on a graphite target at the iThemba LABS time-of-flight facility was measured. The neutron fluence energy distribution was obtained from the pulse height distribution by Bayesian unfolding with the code MAXED using a response matrix that was determined experimentally. The result obtained is in good agreement with the neutron fluence energy distribution of the graphite target measured with the NE230 scintillator using the time-of-flight method at the iThemba LABS time-of-flight facility.

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