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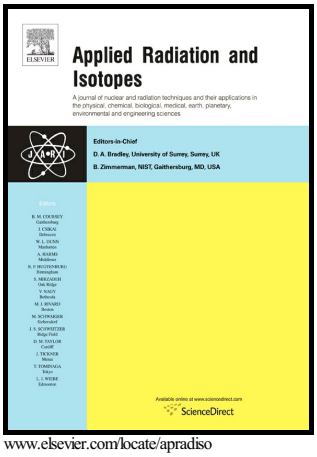

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CYSP-HS: a new version of the CYSP directional neutron spectrometer with increased sensitivity

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Abstract

CSYP (CYlindrical SPectrometer) is a directional neutron spectrometer based on a single moderator embedding multiple thermal neutron detectors. Similarly to Bonner Spheres, CYSP responds from thermal up to GeV neutrons and the spectrum is obtained via few-channel unfolding methods. CYSP has the shape of a polyethylene cylinder with diameter 50 cm and height 65 cm. Owing on a thick collimator and on a specifically designed shielding structure, the internal detectors only respond to neutrons coming from a known direction. Internal thermal neutron detectors are one-cm^2 ^{6}LiF-covered silicon diodes.

Un upgraded version of CYPS was developed to work in low intensity applications, such as cosmic field measurements. It is called CYSP-HS (High-Sensitivity) and is equipped with large area ^{6}LiF-covered silicon diodes (LATND, Large Area Thermal Neutron Detectors). Compared with the former CYSP, the sensitivity increased approximately by an order of magnitude.

This paper presents CYSP-HS focusing on the new internal detectors, the response matrix and its verification in a reference field of Am-Be available at the Politecnico di Milano.

Keywords: Neutron spectrometry; Neutron dosimetry; CYSP, CYPS-HS, NESCOFI, NEURAPID, Single-moderator, directional spectrometry