

Publication

A low-mass neutron flux monitor for the n_TOF facility at CERN

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A small-mass system has been developed for monitoring the flux of neutrons with energy up to 1 MeV at the new time-of-flight facility at CERN, n_TOF. The monitor is based on a thin Mylar foil with a Li-6 deposit, placed in the neutron beam, and an array of Silicon detectors, placed outside the beam, for detecting the products of the Li-6(n, alpha)H-3 reaction. The small amount of material on the beam ensures a minimal perturbation of the flux and minimizes the background related to scattered neutrons. Moreover, a further reduction of the gamma-ray background has been obtained by constructing the scattering chamber hosting the device in carbon fibre. A detailed description of the flux monitor is here presented, together with the characteristics of the device, in terms of efficiency, resolution and induced background. The use of the monitor in the measurement of neutron capture cross-sections at n_TOF is discussed.

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