

Unfolding of neutron spectra from readings of a Bonner multisphere spectrometer by expanding the spectrum in terms of Legendre polynomials using Tikhonov's regularization

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To unfold the neutron spectrum in a wide energy range from 10^{-8} to 10^3 MeV, using the readings of the Bonner multisphere spectrometer, it is necessary to solve the integral Fredholm equation of the 1st kind. The paper presents a method for solving this equation based on the expansion of the neutron spectrum in terms of shifted Legendre polynomials using Tikhonov's regularization. As an example, the problem of reconstructing neutron spectra for "soft" and "hard" reference fields at the JINR Phasotron is analyzed. The proposed method is relevant for the purposes of ensuring the radiation safety of personnel behind protective screens at accelerators and reactors.