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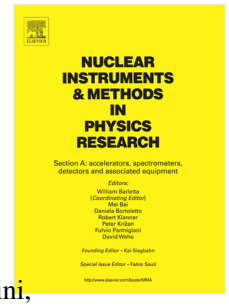

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Neutron field measurement at the Experimental Advanced Superconducting Tokamak using a Bonner sphere spectrometer

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Abstract: The neutron field measurement was performed in the Experimental Advanced Superconducting Tokamak (EAST) experimental hall using a Bonner sphere spectrometer (BSS) based on a ^{3}He thermal neutron counter. The measured spectra and the corresponding integrated neutron fluence and dose values deduced from the spectra at two exposed positions were compared to the calculated results obtained by a general Monte Carlo code MCNP5, and good agreements were found. The applicability of a homemade dose survey meter installed at EAST was also verified with the comparison of the ambient dose equivalent H*(10) values measured by the meter and BSS.

Keywords: Bonner sphere spectrometer, EAST, neutron spectrum, neutron fluence, neutron dose

1 Introduction

Neutron radiation exists around the Experimental Advanced Superconducting Tokamak (EAST) mainly as the 2.45 MeV neutrons are emitted from the deuterium plasma via the D(d, n)^{3}He fusion reactions [1-6]. The fusion neutrons from the plasma penetrate through the vacuum vessel walls of the tokamak and further interact with air, heating facilities and diagnostic devices in the EAST experimental hall, which result in the continuous neutron spectra from thermal region to about 2.45 MeV. The neutron spectra measured inside the EAST experimental hall are of great significance in many