HTPD 2018

Contribution ID : **313**   Type : **not specified**

14.51 Commissioning of stilbene scintillation detector for vertical neutron camera in the Large Helical Device

Thursday, 19 April 2018 10:31 (120)

Neutron emission profile has been measured in NB-heated deuterium plasmas of LHD by using the vertical neutron camera (VNC) to obtain radial profile of beam ions. The fundamental performance test of the stilbene detector (SD) used for the VNC is performed as part of commissioning for the system. The detector responses to various energies of fast neutron were examined in accelerator-type neutron source facilities to understand fundamental property of the SD. Total charge of neutron-driven pulse increased with increase of neutron energy as expected. The obtained response function is available for neutron spectrometry in the future. In our system, anode signal of PMT connected to the SD is fed into a fast ADC equipped with FPGA for automated n-gamma discrimination. Since the signal level from PMT anode is week, quality of pulse shape depends on coaxial cable length. Therefore, we checked effect of cable length on pulse shape. The result indicates that coaxial cable up to 30 m in length can provide good n-gamma discrimination capability. Based on this, we determined the distance between the places of the SD and the instrument rack for ADC. In this paper, results of commissioning of SD for the VNC is presented. Representative results of neutron emission profile in LHD is also shown.

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Session Classification :   Session #14. Thursday Morning Poster Session