

HTPD 2018



Contribution ID : 125

Type : not specified

12.50 Effects of neutron and gamma ray on charge-coupled device for VUV/EUV spectroscopy in deuterium discharges of Large Helical Device

Wednesday, 18 April 2018 20:31 (120)

Charge-coupled device (CCD) is widely used as a detector of vacuum spectrometers in fusion devices. Recently, deuterium plasma experiments have been started in Large Helical Device (LHD). A lot of neutrons are produced during the D-D operation with energies of 2.45 MeV and 14.1 MeV in D-D and D-T reactions, respectively. Meanwhile, gamma rays are also radiated from plasma facing components and laboratory structural materials in a wide energy range through the neutron capture. It is well known that these neutrons and gamma rays bring serious problems to plasma diagnostic systems. Therefore, it is important to examine an effect of neutrons and gamma rays on the CCD. Several CCDs of VUV/EUV spectrometers for spectrum and spatial profile measurements installed on LHD at different locations are used to examine the effect of neutrons and gamma rays. An additional CCD placed in a special shielding box made of 10 cm thick polyethylene with 10% boron and 1.5 cm thick lead, which is located at a distance of 10 m from the LHD plasma center, is also used for detailed analysis. It is found that the CCD signal noise enhanced during D-D discharges mainly originates in the gamma rays.

Primary author(s) : LIU, YANG (Graduate University for Advanced Studies)

Co-author(s) : MORITA, Shigeru (National Institute for Fusion Science); OISHI, Tetsutarou (National Institute for Fusion Science); GOTO, Motoshi (National Institute for Fusion Science)

Presenter(s) : LIU, YANG (Graduate University for Advanced Studies); MORITA, Shigeru (National Institute for Fusion Science); OISHI, Tetsutarou (National Institute for Fusion Science); GOTO, Motoshi (National Institute for Fusion Science)

Session Classification : Session #12, Wednesday Night Poster Session