Lost fast ion behavior in the Large Helical Device

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For lost fast ion studies in confined plasmas, the new scintillator probe has been designed and was installed into the new location of the Large Helical Device (LHD). A periscope with eyepiece, relay, and objective lenses is employed to transmit the scintillator light to an image intensified charge coupled device (I-CCD) camera and 3x3 photomultiplier arrays. To protect the periscope from severe heat loads, the probe shaft, which is cooled by water or gas flow, is covered by carbon pipes. The temperatures of the probe shaft and scintillator plate are measured by thermocouples. During the neutral beam (NB) injection into the LHD, the fast ion profile at the edge plasma is investigated in detail using the scintillator probe. The measured results are compared with fast ion orbits estimated from the deposition profile of NBs. The design and the first result using new scintillator probe will be presented.

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