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Edge current density measurement using Li-beam on JT-60U
KENSAKU KAMIYA, TAKAAKI FUJITA, ATSUSHI KOJIMA, HIROTAKA KUBO, JAEA, Naka — A 10keV Li-beam probing system has been developed on JT-60U for the edge current density measurement using Zeeman polarimetry (ZP), which has 20 channels having spatial resolution of up to 1cm at r/a$\sim$0.8-1. The diagnostic makes it possible to measure the electron density and its fluctuation by BES, ion temperature and rotation velocity by CXRS, simultaneously. Recent experiment on JT-60U, we have achieved that the Li-beam injection to the NBI heated plasma with beam current of up to 5mA. One of advantages on JT-60U is high Bt operation up to 4T, which enables us to measure the edge current density with high precision using ZP. By using a high throughput spectrometer, we confirmed that each circular polarized components are fully separated by +/-0.1 nm from linear polarized one at Bt=4T. Doppler broadening is found to be small as 0.04 nm. In order to select the sigma component of the Zeeman triplet of the Doppler shifted Li emission, the etalon filter having FWHM of $\sim$0.1 nm is utilized. A new tuning method of central wavelength has been demonstrated, scanning the beam acceleration voltage during a single shot using both temperature and rotation control. Details of the design and performance are presented.

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