Abstract Submitted
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**Azimuthal Doppler shift of absorption spectrum in optical vortex laser absorption spectroscopy**[1] SHINJI YOSHIMURA, National Institute for Fusion Science, MITSUTOSHI ARAMAKI, Nihon University, NAOYA OZAWA, Nagoya University, KENICHIRO TERASAKA, MASAYOSHI TANAKA, Kyushu University, KENICHI NAGAOKA, TOMOHIRO MORISAKI, National Institute for Fusion Science — Laser spectroscopy is a powerful diagnostic tool for measuring the mean flow velocity of plasma particles. We have been developing a new laser spectroscopy method utilizing an optical vortex beam, which has helical phase fronts corresponding to the phase change in the azimuthal direction. Because of this phase change, a Doppler effect is experienced even by an atom crossing the beam vertically. The additional azimuthal Doppler shift is proportional to the topological charge of optical vortex and is inversely proportional to the distance from the beam axis in which the beam intensity is vanished by destructive interference or the phase singularity. In order to detect the azimuthal Doppler shift, we have performed a laser absorption spectroscopy experiment with the linear ECR plasma device HYPER-I. Since the azimuthal Doppler shift depends on a position in the beam cross section, the absorption spectra at various positions were reconstructed from the transmitted beam intensity measured by a beam profiler. We have observed a clear spatial dependence of the Doppler shift, which qualitatively agreed with theory. Detailed experimental results, as well as remaining issues and future prospect, will be discussed at the meeting.

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