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Direct identification of axial plasma momentum in a magnetic nozzle helicon plasma KAZUNORI TAKAHASHI, AIKI CHIBA, ATSUSHI KOMURO, AKIRA ANDO, Tohoku University, HELICON THRUSTER TEAM — Axial components of the plasma momentum arising from plasma production, plasma loss to a wall, and plasma expansion in a magnetic nozzle are experimentally identified by the direct measurement of the force exerted to the helicon source structures, which consist of the axial and radial source boundary and the magnetic nozzle. The axial momentum corresponding to the source electron pressure is exerted to the source back plate, while some of the axial momentum is lost to the radial wall by the radially lost ions when they are already accelerated in the plasma core along the axis. Once the plasma is ejected into the magnetic nozzle, their radial momentum is converted into the axial one by the Lorentz force due to the radial magnetic field and the azimuthal plasma current.

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