

CURRENT PROFILE MEASUREMENT ON THE DIII-D TOKAMAK

R.J. Jayakumar,* S.L. Allen,* K.H. Burrell, L.L. Lao, M.A. Makowski,* C.C. Petty,
D.M. Thomas

General Atomics, P.O. Box 85608, San Diego, California 92186-5608

Contact author: R.J. Jayakumar, General Atomics, P.O. Box 85608, San Diego,
California 92186-5608, Phone (858) 455-2770, Fax (858) 455-4156,
e-mail: Jay.Jayakumar@gat.com

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ABSTRACT. The measurement of the plasma current profile is crucial to many operating regimes and investigations on the DIII-D tokamak. The measurement is required to obtain accurate equilibria and to accurately calculate stability and transport characteristics of the plasma. The measurement of the profile is also required to obtain the different components of the current, to guide efforts on the control of the current profile and experiments towards obtaining steady-state operating regimes. The edge current profile measurement is necessary to understand the formation of edge pedestal and ELMs. The DIII-D tokamak has a 3-array, 45-channel motional Stark effect (MSE) diagnostic to measure the plasma current density and radial electric field. A 32-channel Li-beam diagnostic has recently been installed on the DIII-D tokamak for the measurement of edge current density. Both the diagnostics measure current profile from the measurement of the pitch angle of the magnetic field which, in turn, is derived from the orientation angle of polarization of the appropriate neutral beam spectral line. The MSE and the Li-beam diagnostics are described and some examples of measurements are shown.

*Lawrence Livermore National Laboratory, Livermore, California USA.