

Abstract Submitted
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Measurement of helicon wave coupling for current drive and anticipated role for high beta KSTAR plasmas¹ S.J. WANG, H.J. KIM, M. JOUNG, J.H. JEONG, J.H. KIM, Y.S. BAE, J.G. KWAK, National Fusion research Institute, Daejeon, Korea, H.H. WI, Kwangwoon Univ., Seoul, Korea, H.-S KIM, Seoul Natl Univ., Seoul.Korea — Helicon wave current drive has been suggested for efficient off-axis current drive in high electron beta tokamak plasmas [1]. Fast wave drives centrally peaking current in the frequency range up to several ion cyclotron harmonics in the present tokamaks, such as KSTAR. Increasing fast wave frequency up to LH resonance frequency at the plasma edge, the spiral propagation of wave at the outer region of plasma lengthens the wave path to the plasma center. Also, optical thickness increases with frequency. It is expected that these effects produce efficient off-axis power deposition depending on the electron beta and magnetic field pitch. A low power TWA for helicon wave was installed and tested in KSTAR tokamak which is aiming for the steady-state high beta plasma requiring off-axis current drive. The power coupling properties of TWA at various plasma conditions will be presented. In addition to the coupling efficiency, issues such as load sensitivity and unwanted slow wave coupling will be addressed. Also, the simulation of plasma performance with the combination of helicon wave current drive and other conventional heating and current drive power in KSTAR will be discussed.

[1] V. L. Vdovin, Plasma Phys. Reports 39 (2013) 115.

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