Abstract Submitted
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Non-inductive current built-up by local electron cyclotron heating and current drive with a 28 GHz focused beam on QUEST[1] TAKUMI ONCHI, HIROSHI IDEI, MAKOTO HASEGAWA, HIROAKI OHWADA, HIDEKI ZUSHI, KAZUAKI HANADA, Kyushu University, TSUYOSHI KARIYA, University of Tsukuba, KISHORE MISHRA, Institute for Plasma Physics, TAICHI SHIKAMA, Kyoto University, QUEST TEAM — The plasma current can be driven solely by injecting electron cyclotron waves (ECWs) in spherical tokamak (ST) configuration. A system of 28 GHz gyrotron (maximum power: 270 kW) is renewed and reinstalled on QUEST. A focused ECW beam, whose diameter is about 5 cm at the second harmonic resonance, is injected for local ECW heating and current drive. The local power density at resonance exceeds 75 MW/m^2 at an injection power of 150 kW. The incident ECW polarization can be adjusted employing the phase shifter consisting of two corrugated plates [2]. During 1.25 second pulse of ECH, plasma current is built up to $I_{\rm p}$ = 70 kA fully non-inductively with a core electron density of $n_{\rm e} > 10^{18}$ m^{-3}. The closed flux in such ST plasma is determined at the inboard limiter on the center stack. Energetic electrons are also responsible for the pressure and equilibrium.

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[2]T.Ii *et al.*, Rev. Sci. Instrum. 86, 023502 (2015)

Takumi Onchi
Kyushu University

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