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Generation of off-axially localized tail electrons in helical antenna produce cylindrical plasma. SONU YADAV, SOUMEN GHOSH, SAYAK BOSE, P K CHATTOPADHYAY, J GHOSH, D BORA, Institute for Plasma Research — Off-axially localized tail electrons are observed in helical antenna produce cylindrical radio frequency (RF) plasma. Although, tail electrons are commonly observed in capacitive and inductive plasmas, localization of their population only at the off-axis of a cylindrical RF system is very unique. Moreover, we are reporting the generation of tail electrons even in absence of double layer in expanding helical antenna produce plasma. It is also shown that the confinements of these tail electrons are restricted only at the off-axis at Argon fill pressure bellow 1x10^{-3}mbar. Experimental results will be presented to show that the tail electrons which generate off-axially in the source chamber are also found at the expansion chamber. External axial diverging magnetic field lines are bringing them from narrow source to large expansion chamber. To understand the underline mechanism of these tail electrons generation, role of (a) RF electric fields via changing RF source power and (b) their off-axial confinement with rising magnetic fields are discussed. Quantitative discussion on self-consistent model for collisionless RF power coupling with edge electrons will also be presented.

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