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The Combining Effect of the Inductive Electric Field and the Lower Hybrid Waves on the Impurity Ions Toroidal Rotation in the Lower Hybrid Current Drive Tokamak Plasmas

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Plasma rotation in tokamaks driven by the lower-hybrid-waves (LHW) was firstly reported by the Alcator C-Mod team and also observed in the EAST tokamaks. The LHW injection can induce both co- and counter-current directed changes in toroidal rotation. The direct momentum absorption of the LHW induces the impurity ions to rotate in the counter-current direction. The inductive electric field decreases due to the drop of the loop voltage during the lower hybrid current drive. The inductive electric field in tokamaks has considerable effect on the impurity ions rotation and causes the impurity ions to rotate in the counter-current direction. The rotation of the impurity ions is usually measured in the experiments. The resulting rotation velocity of the impurity ions should be determined by the combining effect of the inductive electric field and the LHW. For the higher current case, the effect of the inductive electric field is negligible. For the lower current case, the effect of the inductive electric field can not be neglected.

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