

Abstract Submitted  
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**Experimental studies on nonlinear cyclotron harmonic absorption**

JAECHUN SEOL, YONG-SU NA, JAYHYUN KIM, National Fusion Research Institute, A.C.C. SIPS, Max-Planck Institute fur Plasmaphysik, ASDEX UPGRADE TEAM — Nonlinear electron cyclotron resonance heating (ECRH) is studied experimentally in the ASDEX Upgrade tokamak. Pre-ionization process is measured and analyzed to study nonlinear cyclotron resonance absorption. In the pre-ionization process, electrons are heated from the room temperature. Since cold electrons stay in the microwave beam relatively longer in this case, nonlinear interaction between the microwaves and particles are more likely to happen. The new multi-frequency ECRH system, working at 105 GHz and 140 GHz is used for the experiments. It is found that pre-ionization is more efficient at 105 GHz and than 140 GHz as predicted theoretically. It is the first experimental result that verifies the theory.

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