

Abstract Submitted
for the DPP13 Meeting of
The American Physical Society

Fast ion loss associated with perturbed field by resonant magnetic perturbation coils in KSTAR JUN YOUNG KIM, University of Science and Technology, Daejeon, South Korea, JUNGHEE KIM, TONGNYEOL RHEE, S.W. YOON, G.Y. PARK, Y.M. JEON, NFRI, Daejeon, South Korea, M. ISOBE, A. SHIMIZU, K. OGAWA, NIFS, Toki, Japan, J.-K. PARK, PPPL, Princeton, USA, M. GARCIA-MUNOZ, IPP, Garching, Germany — Resonant magnetic perturbation (RMP) is the most promising strategies for ELM mitigation/suppression. However, it has been found through the modeling and the experiments that RMP for the ELM mitigation can enhance the toroidally localized fast ion loss. During KSTAR experimental campaigns in 2011 and 2012, sudden increase or decrease of the fast ion loss has been observed by the scintillator-based fast ion loss detector (FILD) when the RMP is applied. Three-dimensional perturbed magnetic field by RMP coil in vacuum is calculated by Biot-Savart's law embedded in the Lorentz orbit code (LORBIT). The LORBIT code which is based on gyro-orbit following motion has been used for the simulation of the three-dimensional fast ion trajectories in presence of non-axisymmetric magnetic perturbation. It seems the measured fast ion loss rate at the localized position depends on not only the RMP field configuration but also the plasma profile such as safety factor and so on, varying the ratio between radial drift and stochastization of the fast-ion orbits. The simulation results of fast ion orbit under magnetic perturbation w/ and w/o plasma responses will be presented and compared with KSTAR FILD measurement results in various cases.

Jun Young Kim
University of Science and Technology, Daejeon, South Korea

Date submitted: 12 Jul 2013

Electronic form version 1.4