Abstract Submitted
for the DPP12 Meeting of
The American Physical Society

Simulation study of Alfven eigenmode induced energetic-ion transport in LHD SEIYA NISHIMURA, YASUSHI TODO, NORIYOSHI NAKAJIMA, MASAKI OSAKABE, National Institute for Fusion Science, SATOSHI YAMAMOTO, Institute of Advanced Energy, Kyoto University, DONALD A. SPONG, Oak Ridge National Laboratory, YASUHIRO SUZUKI, National Institute for Fusion Science — For the achievement of magnetic confinement fusion, the interaction between Alfven eigenmodes (AEs) and energetic ions is an important issue to be resolved. In the Large Helical Device(LHD), the AE bursts and the energetic-ion transport and losses have been observed during the neutral beam injection. However, it has not been clarified yet how the 3-dimensional magnetic field affects the AE induced energetic-ion transport. It is worth investigating this problem since the particle dynamics in the 3-dimensional configuration such as the helical trapping might enhance the transport. In this study, we perform the reduced simulation, where the AE spatial profile calculated with AE3D code is assumed to be constant in time and the evolution of the amplitude and the frequency is computed in a way consistent with the interaction between the energetic ions and AE. The energetic-ion dynamics is followed in the electromagnetic field that is the sum of the equilibrium field by HINT code and the AE perturbation. It is found that the AE amplitude continues to increase gradually after the exponential growth for the isotropic energetic-ion velocity distribution, whereas the saturation takes place for the beam-type distribution. We will report on the detailed analysis of the energetic-ion dynamics.

Seiya Nishimura
National Institute for Fusion Science

Date submitted: 24 Jul 2012 Electronic form version 1.4