replacing DPP16-2016-000410.
KSTAR session

Abstract Submitted
for the DPP16 Meeting of
The American Physical Society

**A Mechanism of ELM Mitigation by External Magnetic Field Perturbations** RAGHVENDRA SINGH, H JHANG, J.-H. KIM, Natl Fusion Res Inst, T.S. HAHM, Natl Fusion Res Inst; Seoul National University — We study the impact of external magnetic perturbations (EMP) on the stability of ballooning mode (BM). We use: 1) the two-step process; 2) standard four wave interactions. In two-step process, we consider EMP are long wave-length perturbations interacting with short scale BM and generating side-bands of higher harmonics. This calculates contributions from all the high toroidal mode numbers. EMP can modify the dispersion characteristics of BM - the growth spectrum becomes broader in$k^{BM}$space. The increase in high$k^{BM}$can lead to the mitigation of an ELM crash by increasing turbulent transport. New nonlinear instability is also found even below the BM threshold at large EMP amplitude. In four wave interaction, EMP act like a short scale pump wave interacting with BM and creating two sidebands. The side-bands couple with the pump and produce the ponderomotive force, magnetic stress at BM frequency. EMP may enhance the BM instability threshold if RMP $\vec{k}_{BM} \leq \vec{k}_{RMP}$and reduce the threshold if$\vec{k}_{BM} > \vec{k}_{RMP}$.

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Date submitted: 13 Jul 2016 Electronic form version 1.4