Abstract Submitted
for the DPP17 Meeting of
The American Physical Society

New investigation of reconnection time scale of the m/n=1/1 sawtooth instability in tokamak plasmas[1] H. K. PARK, NFRI, UNIST, Y. B. NAM, UNIST — The condition of magnetic shear and reconnection time scale of the m/n=1/1 flux rope (sawtooth instability) in the core of tokamak plasma have been disputed for more than four decades. Recent validation of the condition of the core magnetic shear (i.e., the core safety factor (q_0) is below ~ 1.0 before the crash and above ~ 1 after the crash) in KSTAR [1] encouraged to investigate the observed crash time scale which is known to be one or two order of magnitude faster than the critical reconnection time ($\tau_c \cong \sqrt{\tau_A \tau_s}$) proposed by the Kadomtsev model [2] where τ_A and τ_s are Alfven and resistive time, respectively. It has been universal that the experimentally observed reconnection time scale is indeed faster than τ_c. It is rare but there are cases in which the reconnection time is comparable to τ_c. This paper investigates the role of the symmetry (poloidal and toroidal) of the 1/1 flux rope inside the $q \sim 1$ surface in determining the reconnection time. [1] Nam, Y., PhD Thesis, POSTECH (2017). [2] Kadomtsev, B., Sov. J. Plasma Phys. 1, 389 (1975).

[1]This work is supported by MSIP of Korea under NRF of Korea under Contract No. NRF-2014M1A7A1A03029865

Minwoo Kim
Ulsan Natl Inst of Sci
Tech

Date submitted: 13 Jul 2017 Electronic form version 1.4