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## PD/P8-18: Study on TAE-Induced Fast-Ion Loss Process in LHD

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Characteristics of fast-ion losses induced by toroidal- lfvén eigenmode (TAE) have been investigated over wide parameter ranges of the Large Helical Device (LHD) plasmas to reveal the fast-ion loss process. To study fast-ion losses, a scintillator-based lost-fast ion probe (SLIP) is used, and an increment of fast-ion loss flux due to the TAEs from the neoclassical orbit loss level (Delta Gamma (fast ion)) is measured. It is newly found that the dependence of fast-ion loss flux on TAE magnetic fluctuation amplitudes changes at a certain fluctuation level. Experimental results show that in the low TAE magnetic fluctuation amplitude ( $b_{\theta}$  TAE) regime, Delta Gamma (fast ion) is proportional to  $b_{\theta}$  TAE whereas Delta Gamma (fast ion) increases with the square of  $b_{\theta}$  TAE in the higher  $b_{\theta}$  TAE regime. Simulation by orbit following codes that incorporates magnetic fluctuations with frequency chirping down due to TAEs suggests the change of the fast-ion loss process from a convective (Delta Gamma fast ion proportional to  $b_{\theta}$  TAE) to a diffusive (Delta Gamma fast ion proportional to  $b_{\theta}^2$  TAE) character as  $b_{\theta}$  TAE increases.

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