

Abstract Submitted  
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**Enhancement of threshold electric field for relativistic runaway electrons due to magnetic fluctuation and synchrotron radiation**<sup>1</sup> SHUCAI LI, LU WANG, ZHONGYONG CHEN, DUWEI HUANG, RUIHAI TONG, Huazhong University of Science and Technology — The dynamics of relativistic electrons are analyzed using the relativistic Fokker-Planck equation including deceleration due to synchrotron radiation (SR) [1,2] and radial diffusion loss caused by magnetic fluctuation (MF) [3]. Threshold electric field for avalanche growth is enhanced, and the growth rate is reduced by the combined effect of MF and SR as compared to the case with only SR. The threshold electric field is determined by the time scales balance between momentum evolution and radial diffusion loss induced by MF, and increased with level of MF. More importantly, the hysteresis behavior of runaway pointed out by [2] does not exist anymore. This is because the seed electrons cannot be sustained as a result of diffusion loss. [1] J. R. Martn-Sols, R. Sanchez, and B. Esposito, *Phys. Plasmas* **6**, 3925 (1999). [2] P. Aleynikov and B. Breizmann, *Phys. Rev. Lett.* **114**, 155001 (2015). [3] P. Helander, L.-G. Eriksson, and F. Andersson, *Phys. Plasmas* **7**, 4106 (2000).

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