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Analysis of Runaway Electron Synchrotron Emission in Alcator C-Mod[1] A. TINGUELY, R. GRANETZ, MIT Plasma Science and Fusion Center, A. STAHL, Chalmers University of Technology — Alcator C-Mod's high magnetic field allows relativistic "runaway" electron (RE) synchrotron radiation (SR) to be observed in the visible wavelength range. Our aim is to determine the evolution of the RE energy distribution function, current, and density from measured SR spectra, providing insight into basic plasma physics as well as mitigation for fusion devices. Recent theoretical studies [1-3] predict that the SR reaction force and collisional friction will balance the electric force, forming a "bump" on the tail of the energy distribution. However, both mono-energetic and monotonically-decreasing distributions fit the experimental data equally well. The COllisonal Distribution of Electrons [4-5] code is applied to C-Mod RE discharges and compared to experiment. In addition, a scan in magnetic field from 2.7 - 8 T explores the importance of SR as a power loss mechanism and limit on the maximum RE energy.
[1] Aleynikov, et al. PRL 114 (2015).
[2] Decker, et al. PPCF 58 (2015).
[3] Hirvijoki, et al. JPP 81 (2015).
[4] M. Landreman, et al. CPC 185 (2014).
[5] A. Stahl, et al., to appear in NF. arXiv:1601.00898 [physics.plasm-ph]

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