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Statistical study of dipolarization front at magnetotail: Fermi and betatron acceleration

H. Fu, Y. Khotyaintsev, A. Vaivads, M. André, and S. Huang
Swedish Institute of Space Physics, Uppsala, Sweden (huishanf@gmail.com)

The dipolarization front (DF) is a tangential discontinuity formed after reconnection in the Earth's magnetotail. It has typical width of ion gyro-radius, indicating that the frozen-in condition is satisfied for electrons but broken for ions near this structure. Behind the DF, Fermi and betatron acceleration are frequently observed. Fermi acceleration is associated with the shortening of the flux-tube length, while betatron acceleration is associated with the compression of flux-tubes. The recent case study shows that Fermi and betatron acceleration are dominant inside the decaying and growing flux-pileup region, respectively. To better understand this issue, we use the 9-year (2001-2009) Cluster data to investigate the statistical relation between electron acceleration and flux-pileup region. We get a nice agreement with the previous case study.