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# Energetic particles boundaries in the inner magnetosphere observed by the Cluster

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Energetic particles (ions and electrons) boundaries between the outer plasma sheet and the inner magnetosphere are often observed by Cluster spacecraft. Ions and electrons boundaries show obvious different. Such kind of sharp energetic interfaces could provide us an important tool of remote sensing of distant equatorial boundaries, e.g. distant neutral lines, last closed field lines (LCFL) or near Earth neutral line (NENL) etc. On Feb.02, 2003 at 14-16UT when the Cluster constellation was near the perigee (˜ 4Re) and at local midnight, three obvious boundary structures were consecutive observed by the Cluster with a large separated configuration during a strong magnetospheric substorm (AE˜1200nT). The locations of the two boundaries mapped to the equatorial tail are presumably ˜10Re and ˜30Re respectively. The energetic particle boundaries signatures detected by CLUSTER/RAPID in the four separated locations of Cluster provide us detailed information about the location of distant equatorial boundaries generated by different mechanism.