



Electron acceleration at quasi-perpendicular shock: A result of 3D PIC simulation

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We have carried out a three-dimensional simulation of a quasi-perpendicular shock on the JAXA's new super-computer facility. The simulation parameters were selected to simulate a Cluster-II observational result reported by Seki et al. (2009). The full mass ratio $M/m=1840$ was taken for this simulation, and almost one ion inertia length square could be allocated for the simulation. In this simulation, complicated wave activity is found at the most front end of the shock foot region. Efficient production of non-thermal electrons is also observed, and the obtained energy spectrum is similar to the Geotail observation reported by Oka et al. (2006). The electron acceleration process found in our simulation is different from previously proposed mechanisms, and we found that the shapes of the electron energy spectra depend on the phase of the shock self-reformation. We will discuss the electron acceleration mechanism in detail and its relation with the complex behavior of the shock transition region.