

An energy limitation of electron acceleration at quasi-perpendicular shocks

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The electron acceleration process at quasi-perpendicular has been found in a 3-D PIC simulation. We have shown that the trapping by the large-amplitude electromagnetic wave excited in the most front region of the shock foot is essential for the acceleration. During the trapping electrons get more energy from the motional electric field of the flow. In contrast to the standard Fermi acceleration at quasi-parallel shocks, the electron acceleration process at quasi-perpendicular shocks is much quicker (order of the ion cyclotron period); however, electrons cannot experience effective acceleration again so that there would be a limitation of the acceleration. Recently, we have a chance to use a large computer resource of 'K-computer', and we have studied to address the energy limit of the electron acceleration process at quasi-perpendicular shocks by using a parametric study changing with various simulation parameters. In this paper, we will show initial results of the parametric study.