

準垂直衝撃波におけるプラズマ波動の電子加速に果たす役割

篠原 育 [1]; 藤本 正樹 [2]
[1] 宇宙研 / 宇宙機構; [2] 宇宙研

Roles of electromagnetic fluctuation in electron acceleration at a quasi-perpendicular shock

Iku Shinohara[1]; Masaki Fujimoto[2]
[1] ISAS/JAXA; [2] ISAS, JAXA

As reported previous meetings, we found efficient production of non-thermal electrons in results of a three-dimensional full kinetic simulation of a quasi-perpendicular shock. In this paper, we discuss results of detailed accelerated particle trajectory analysis. The seed acceleration occurs in large-amplitude electromagnetic wave excited in the most front region of the shock transition region. The accelerated electrons keep staying in the foot region due to the scattering by the electromagnetic wave and a part of electrons can get energy from the motional electric field (in the shock rest frame). Since large-amplitude electromagnetic wave is only observed in 3D simulations, no electron acceleration is observed in previous 1D and 2D simulations. After the seed acceleration, these electrons can be also accelerated at the shock ramp region by the shock drift acceleration. The further acceleration occurs during the steepen phase of the self-reformation, and the acceleration efficiency depends on the phase of the shock self-reformation. We will discuss detailed physics of the seed acceleration process in the foot region.