

The evaluation of the injection, rejection, and the acceleration of the high energy charged particles in storm time

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To treat the charged particles in the radiation belt, we used to assume the preservation of the adiabatic invariants and use the guiding center approximation. But recently, we strictly examined these treatments and found that there are several problems.

We calculated the trajectory of the charged particles in the time scale of the geomagnetic storm, and in this paper, we discuss the injection, the rejection and the acceleration of charged particles in storm time.

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After this, we discuss charged particles in dipole like magnetic field.

In this case, the state of charged particles is separated into two states, the trapped and the un-trapped conditions. In trapped condition, the particles are well-magnetized and the guiding center approximation is a good method, but in un-trapped condition, the particles are not magnetized. And the transformation of these two states is not gradually, but critically. So we must calculate the trajectories of the particles including the Larmor motion in the critical region.

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