

Nonadiabatic parameter in the frequency space of trapped particle motion in the magnetotail

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To know the nonadiabatic behavior of trapped particle motion in the magnetotail is important in understanding particle acceleration and the plasma equation of state in the magnetotail. It is known that when the square of the kappa parameter, which is equal to the ratio of the field line curvature radius to the particle Larmor radius, becomes comparable to one, the particle motion becomes nonadiabatic and the conservation of magnetic moment is violated. A nonadiabatic parameter of trapped particle motion, which is equal to the ratio of the gyrofrequency to the bounce frequency of a particle, is defined and is shown to be a useful parameter to represent the nonadiabatic behavior of trapped particle motion in the magnetotail configuration.