**Energy transfer chain in the Earth's magnetosphere**

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The Earth's magnetosphere, extending from 1000 km above the Earth's surface to 70,000 km toward the Sun or $10^6$ km in the opposite direction, is a region permeated with plasmas and magnetic field. Such region shields the Earth from energetic particles coming from the interplanetary space, and hence is very important to human beings. Although most energetic particles are expelled, some of them can still enter into the Earth's magnetosphere along a special path and subsequently transferred to the near-Earth space, producing colorful auroras. Understanding the transfer of these energetic particles in the magnetosphere—known as energy transfer chain—therefore is an important topic in the study of space weather. Generally, such energy transfer chain follows the Dungey's circle: reconnection of magnetic field at the dayside magnetopause, convection of magnetic field toward the magnetotail, reconnection of magnetic field again in the magnetotail, triggering of substorm and then the dipolarization front in the nightside plasma sheet, convection of suprathermal particles toward the Earth, injection of suprathermal particles into the radiation-belt and ring-current regions, acceleration of these particles to relativistic energies via quasi-linear and non-linear wave-particle interactions. However, the details of this circle/chain have been poorly understood. In this talk, we will comprehensively discuss the details of this chain. Particularly, we will show (1) how the magnetic reconnection is triggered at electron scale at the dayside magnetopause, (2) what type of electron distributions and wave activities can affect the reconnection process at the magnetopause, (3) what magnetic topology should be at the magnetopause reconnection site, (4) how the magnetic reconnection is triggered in the magnetotail, (5) how energetic electrons are accelerated during the magnetopause and magnetotail reconnection, (6) how turbulence and magnetic reconnection couple with each other, (7) how dipolarization fronts are produced in the magnetotail, (8) what's the relation between magnetic reconnection and dipolarization fronts, (9) how energetic electrons are accelerated at dipolarization fronts, (10) how these electrons are injected into the radiation belts, (11) how these electrons are further accelerated to relativistic energies in the radiation belts, (12) whether the quasi-linear process or non-linear process dominates during electron acceleration, (13) how the energy transfer between radiation-belt electrons and ring-current ions happens. From the standpoint of space weather, this talk will cover the entire energy transfer chain in the magnetosphere; from the standpoint of plasma physics, this talk will cover the plasma dynamics at electron scale, ion scale, and MHD scale.