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Magnetic Reconnection in Electron Magnetohydrodynamics HUISHAN CAI, DING LI, USTC, China — The dissipation mechanisms of magnetic reconnection, pressure anisotropy effects and guide field gradient effects on magnetic reconnection and tearing mode instability are investigated, respectively. It is found that the conditions either pressure-based dissipation or electron inertia-based dissipation dominant depend on the relative magnitude between electron thermal Larmor radius and electron inertial skin depth. The dissipation mechanisms have a great relation with the magnitude of guide field. The effects of pressure gradient depend on the relative magnitude between the parallel and perpendicular pressure gradients. The guide field gradient can affect significantly on tearing mode. In the small guide field gradient limit, namely the guide field gradient is smaller than the magnetic field shear at the magnetic null plane, the growth rate of tearing mode instability is enhanced by the guide field gradient. In the large guide field gradient limit, the guide field gradient can destabilize tearing mode instability dramatically and the growth rate is proportional to the guide field gradient.

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