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The second type of sharp-front wave mechanism of strong magnetic field diffusion in metal BO XIAO, CHUNHUI YAN, GANGHUA WANG, MINGXIAN KAN, SHUCHAO DUAN, Institute of Fluid Physics, CAEP, COMPUTATIONAL PHYSICS TEAM — When a strong magnetic field diffuses into a metal, the metal is ablated by Joule heating companying the magnetic diffusion process, and the metal's resistance changes violently with the fastly growing temperature. If the metal is heated to partially ionized plasmas which has a resisitance that is several orders higher than the resistance of the cold metal, the magnetic diffusion process can be approximately described by the sharp-front diffusion wave theory [1], which gives a simple formulas for describing the velocity of diffusion process. However, if the plasmas escapes immediately by, for example, blowing, the sharp-front diffusion wave theory is no longer applicable because the resistance of the conductor becomes infinity. We would need another type of sharp-front diffusion wave theory (Type II Theory) to describe the magnetic diffusion behaviors in this situation. In Type II Theory, the sharp-front diffusion wave velocity depends on 3 parameters, i.e., the magnetic boundary condition B_0, the critial temperature T_c, and the cold metal resistance η_s. The dependence of the velocity on the three parameters is analyzed in details in this presentation.

[1] Bo Xiao, et al, *Physics of Plasmas*, **23**:082104 (2016)

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