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The scaling of the two-fluid resistive and collisionless tearing instability MAHBOUB HOSSEINPOUR, NICKOLAS BIAN, GRIGORY VEKSTEIN, The University of Manchester — The tearing instability of viscous compressible plasma which is embedded in a sheared force-free magnetic field configuration has been studied in the framework of the two-fluid model both for resistive and collisionless reconnection. In the former case, the resistivity of plasma, and in the latter one the finite electron inertia effect, which are characterized respectively by the Lundquist number$S \equiv \frac{\tau_\eta}{\tau_A}$, ($\tau_\eta, \tau_A$ are resistive diffusion and Alfven transient time.), and electron inertial skin depth $d_e \equiv \frac{c}{\omega_{pe}}$ (ω_{pe} is the plasma frequency) are accounted for field reconnection. Under the assumption of constant-"ψ" approximation, the analytical analysis of the linearized Hall-MHD equations yields three different regimes of tearing instability, each which corresponds to particular values of plasma β and $d_i = d_e(\frac{m_i}{m_e})^{1/2}$, the ion inertial skin depth. All possible regimes are shown in the $d_i - \beta$ diagram. Also the transitions between these regimes are explained.

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