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An overview of phenomena related to magnetic reconnection in collisionless plasmas

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In this introductory tutorial, I will discuss, from a non specialist point of view, the basic, multiscale, phenomena involved in collisionless magnetic reconnection, such as electron inertia, electron pressure and Hall effects appearing in Ohm's law. I will also consider other collisionless effects like electron resonances (analogous to Landau Damping) in phase space, deviation from charge neutrality, and non locality which may be also be important. The comparison with results from numerical simulations and space and laboratory experiments will (although very incompletely) be reviewed.