



Similarities and differences between symmetric and asymmetric magnetic reconnection

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The way reconnection operates, from the overall rate of reconnection, to energy conversion and the structure of the reconnection diffusion regions, is determined by inflow conditions. In many cases, such as at the magnetopause of the Earth, inflow conditions do not only vary with time, but are typically different on the magnetosheath and magnetospheric sides. In this situation, magnetic reconnection operates asymmetrically. In the magnetotail on the nightside, however, the two inflow regions are typically much more similar, leading to reconnection configurations, which are approximately symmetric. It is of great interest to understand both, and much is to be learned by comparing the two different modes of operation. While the nature of the physical process dictates that some physical aspects, e.g., the requirement to have a reconnection electric field at X points, have to be invariant of whether the inflow regions are symmetric or asymmetric, other aspects are significantly impacted. Among the latter are heating processes, or electron physics features such as stagnation points, demagnetization, and dissipation. This talk will present an overview of expected similarities and differences, based primarily on theoretical and modeling considerations, but involving also discussions of observational results.