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Cluster Four-Spacecraft Observations of Magnetic Reconnection Sites

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Magnetic reconnection leads to energy conversion in large volumes in space but is initiated in small regions. We report on Cluster observations of such small regions. These four-spacecraft observations allow us to reliably distinguish spatial from temporal features. We investigate the small reconnection regions both in terms of the Generalized Ohm's Law, showing that Hall physics is important, and in terms of various wave phenomena. In this context we identify and describe different regions close to the X-line, e.g. inflow regions, outflow regions and separatrices. We compare our results with recent simulations of magnetic reconnection.