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**Stellarator studies of magnetic reconnection**[1] ALLEN BOOZER, Columbia University — Vacuum magnetic fields in a stellarator can be controlled to give a magnetic island of desired width on any selected rational magnetic surface, which makes stellarators uniquely suitable for reconnection experiments. In a pressureless ideal plasma, a delta function current arises to prevent changes in the island width. The magnetic field produced by this current can be measured outside of the plasma. As the current decays due to plasma dissipation, the time and spatial structure of the resulting field give a non-invasive diagnostic of reconnection. Important parameters include the Alfvén speed, the ion gyroradius using the sound speed, the electron collisionless skin depth, the plasma rotation, which can give a trigger-like phenomenon, and the width of the saturated, or vacuum, island. Plasmas can be produced in a given stellarator device over a broad range of densities, temperatures, and species types, and the saturated island width can be adjusted to any size up to a large fraction of the plasma radius without causing a plasma disruption. Consequently, various regimes of magnetic reconnection can be systematically studied.

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