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# Physics of Plasmas

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DOI: 10.1063/5.0124164

Journal: *Physics of Plasmas*

Date Published: January-2023

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Publication

## E. N. Parker's theorem on the magnetohydrodynamic heating of the solar corona.

B. C. Low

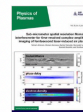
Physics of Plasmas, January 2023, American Institute of Physics  
DOI: [10.1063/5.0124164](https://doi.org/10.1063/5.0124164)

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### What is it about?

The 1972 Parker magnetostatic theorem explains how the Sun's fully ionized, magnetized, X-ray emitting corona is readily maintained at million-degree temperatures everywhere. As an excellent electrical fluid-conductor, the corona is driven by the electric motor, Lorentz force exerted by its magnetic field, with fluid motions acting as a dynamo generating changes in the electric current and magnetic field. On the small scales, no force equilibrium is possible because balancing the Lorentz force endlessly forces a ubiquitous irrepressible formation of infinitesimally thin current sheets that must dissipate into heat by the otherwise negligibly small, coronal electrical resistivity. The featured article constructs an insightful understanding of the theorem by explicitly relating the components of this universal astrophysical process to the topology of the magnetic field.

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