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Fast dissipation of magnetic energy near compact objects

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The release of magnetic energy through magnetic reconnection and turbulence cascades is a major process invoked in active compact objects – neutron stars and accreting black holes. Energy dissipation in the compact objects occurs in a dense radiation field, which impacts the dissipation mechanism and generates copious electron-positron pairs. Radiation spectrum emitted by magnetic dissipation depends on the dimensionless compactness parameter set by the ratio of the released power to the object size. Recent detailed simulations of this process demonstrate a reasonable agreement with the observed X-ray spectra of magnetar bursts and the hard state of accreting black holes.

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