

Transient phenomena powered by a newborn neutron star: GRBs, SLSNe, mergernovae, and AICs

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The formation of neutron stars (NSs), both from collapses of massive stars and mergers of compact objects, can usually be indicated by a bright transient emission that is generated from the explosively-ejected material. In particular, as the newborn NSs can rotate very quickly and have a sufficiently high magnetic field, the spin-down of the NSs would provide a remarkable amount of energy to the emitting material. As a result, internal-origin GRB afterglow emission or super-luminous supernovae can be produced in the massive stellar collapse cases, while fast blue optical transients including the so-called mergernovae/kilonovae can arise from NS mergers and accretion-induced collapses of white dwarfs. Some multi-wavelength emission features can be used to identify and classify these NS-powered transient phenomena.

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