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Collapse of magnetized hypermassive neutron stars in general relativity: Disk evolution and outflows BRANSON STEPHENS, Princeton University, YUK TUNG LIU, STUART SHAPIRO, University of Illinois at Urbana-Champaign — We simulate the evolution in axisymmetry of accretion disks formed self-consistently through collapse of magnetized hypermassive neutron stars (HMNSs) to black holes (BHs). Such stars can arise following the merger of binary neutron stars (NSs) and are secularly unstable to collapse due to MHD-driven angular momentum transport. The rotating BH which forms in this process is surrounded by a hot, massive, magnetized torus. Our code integrates the coupled Einstein-Maxwell-MHD equations and is used to follow the collapse of magnetized HMNSs in full GR until the spacetime settles down to a quasi-stationary state. We then employ the Cowling approximation, in which the spacetime is frozen, to track the subsequent evolution of the disk. This approximation allows us to greatly extend the disk evolutions and study the resulting outflows, which may be relevant to the generation of a gamma-ray burst. We find that outflows are suppressed when a stiff equation of state is assumed for low density disk material and are sensitive to the initial magnetic field configuration.

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