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# Charting the CCSN-GRB Spectrum: Non-Spinning Black Hole-Driven Jets in the LSST Epoch

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GRB jets are launched from rapidly spinning black holes (BHs), anchored by a strong magnetic field, a process known as the Blandford–Znajek (BZ) mechanism. However, most BHs from core collapse are likely born slowly spinning, raising the question of what type of transients emerge in those cases. With the upcoming launch of LSST, it is imperative to map the wide spectrum of transients from core-collapse supernovae (CCSNe) to GRBs. To bridge the underlying physics of the collapsing star and observations, we perform a suite of 3D general-relativistic magnetohydrodynamics (GRMHD) collapsar simulations, which extend from the self-consistent jet launching by an accreting BH to the breakout from the star. We show that even non-spinning BHs produce collimated outflows through a combination of the Blanford-Payne (BP) mechanism from magnetized blobs in the BH accretion disk, and the BZ mechanism via the BH accreting plasma. Such outflows could be the origin of low-luminosity GRBs or fast-blue optical transients. The jets unbind the star, generating a luminous signal observable by LSST. This work marks the first step of mapping the physics of various collapsars on the spectrum between CCSNe and GRBs to observations.

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