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Short gamma-ray bursts in the "time-reversal" scenario[1] RICCARDO CIOLFI, Univ of Trento, DANIEL SIEGEL, Max-Planck Institute for Gravitational Physics, Potsdam-Golm — Leading models relate short gamma-ray bursts (SGRBs) to a relativistic jet launched by the black hole (BH)-accretion torus system that can be formed in a binary neutron star (BNS) or a NS-BH binary merger. However, recent observations by *Swift* have revealed a large fraction of SGRB events accompanied by X-ray afterglows with durations $\sim 10^2 - 10^5$ s, suggesting continuous energy injection from a long-lived central engine, which is incompatible with the short (~ 1 s) accretion timescale of a BH-torus system. The formation of a supramassive NS (SMNS), resisting the collapse on much longer spin-down timescales, can explain these afterglow durations, but leaves serious doubts on whether a relativistic jet can be launched at merger. Here we present a novel scenario that can solve this dichotomy, in which the SGRB is produced *after* the eventual collapse of the SMNS, but observed *before* (part of) its long-lasting spin-down emission. The "time-reversal" in the observation of the two signals is caused by the substantial delay affecting the spin-down emission, due to the optically thick environment surrounding the system generated by the early differential rotation and the subsequent spin-down emission itself.

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