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Prompt Collapse in Binary Neutron Star Mergers: The Effect of the Mass Ratio

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The outcome of a binary neutron star merger dominantly depends on the total mass of the system and the equation of state describing the matter. However, the mass ratio also influences the postmerger evolution, in particular, whether there is a prompt or delayed collapse. Furthermore, the mass ratio influences which fraction of the initial baryonic mass ends up in a disc around a so formed black hole, and the mass of the latter. We investigate the prompt collapse threshold with a new set of general relativistic simulations covering seven mass ratios, and three equations of state. We propose a fitting formula for the dependence of the threshold mass on the mass ratio.

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