Abstract Submitted
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QUASI-PERIODIC BEHAVIOR OF MINI-DISKS IN BINARY BLACK HOLES APPROACHING MERGER[1] MANUELA CAMPANELLI, DENNIS BOWEN, VASSILIOS MEWES, Rochester Inst of Tech, SCOTT NOBLE, NASA Goddard, JULIAN KROLIK, Johns Hopkin University, MIGUEL ZILHAO, University of Lisbon — We present the first GRMHD simulation in which a circumbinary disk around a relativistic binary black hole feeds mass to individual mini-disks around each black hole. Mass flow through the accretion streams linking the circumbinary disk to the mini-disks is modulated quasi-periodically by the streams' interaction with a nonlinear azimuthal m=1 density feature, or "lump", at the inner edge of the circumbinary disk: the stream supplying each mini-disk comes into phase with the lump at a frequency 0.74 times the binary orbital frequency. Because the binary is relativistic, the tidal truncation radii of the mini-disks are not much larger than their ISCOs; consequently, the mini-disks' inflow times are shorter than the conventional estimate and are comparable to the stream modulation period. As a result, the mini-disks are never in inflow equilibrium, with their masses and spiral density wave structures responding to the stream's quasi-periodic modulation. The fluctuations in each mini-disk's mass are so large that as much as 75Such quasi-periodic modulation of the mini-disk structure may introduce distinctive time-dependent features in the binary's electromagnetic emission.

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