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Late–time Kerr tails revisited LIOR M. BURKO, University of Alabama in Huntsville, GAURAV KHANNA, University of Massachusetts Dartmouth — Numerous conflicting results —both analytical and numerical— have been reported on the decay rate of late time tails in the Kerr spacetime. In particular, there has been much disagreement on whether the decay rate of an initially pure multipole moment ℓ is according to $t^{-(2\tilde{\ell}+3)}$, where $\tilde{\ell}$ is the least multipole moment whose excitation is not disallowed, or whether the decay rate is according to t^{-n}, where $n = 2\ell + 3$ if $\ell - m < 2$, $n = \ell + m + 1$ if $\ell - m \geq 2$ is even, and $n = \ell + m + 2$ if $\ell - m \geq 2$ is odd. The answer to this question is very sensitive to the details. In particular, it is very important whether one specifies the velocity or the momentum of the field as part of the initial–data set. We do careful 2+1D numerical simulations, and find the tails decay–rate for the case that has become the testbed of such studies, specifically an initially pure $\ell = 4$, $m = 0$ multipole on a Boyer–Lindquist or ingoing Kerr time slices. We also consider other cases, including non–azimuthal ones, such as an initial $\ell = 6$, $m = 2$ multipole. We emphasize some of the causes for potential errors in 2+1D simulations and argue that conflicting past results may be attributed to them. Specifically, we discuss the misidentification of an intermediate tail as an asymptotic one and the misidentification of noise evolution as that of a signal. We then show that our simulations are free of such errors.

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