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Late–time Kerr tails: "up" and "down" excitations GAURAV KHANNA, University of Massacusetts Dartmouth, LIOR M. BURKO, University of Alabama in Huntsville — We revisit the question of Kerr spacetime late–time scalar–field tails numerically, specifically the excitation of "up" and "down" modes. Specifically, an "up" mode is an excited (ℓ, m) mode because of an initial (ℓ', m) mode for $\ell > \ell'$. The definition of a "down" mode is commensurate. We propose to generalize the Barack–Ori formula for the decay rate of any tail multipole given a generic initial data set, to the contribution of any initial multipole mode. Our proposal leads to a much simpler expression for the late–time power law index. Specifically, we propose that the late–time decay rate of a kinematically allowed $Y_{\ell m}$ spherical harmonic multipole moment because of an initial $Y_{\ell' m}$ multipole is independent of the azimuthal number m, and is given by t^{-n}, where $n = \ell' + \ell + 1$ for $\ell < \ell'$ and $n = \ell' + \ell + 3$ for $\ell \geq \ell'$. The independence of m may be surprising because of the explicit dependence of the Green's function on m. The much greater complexity of the usual Hod formula is an artifact of the additional requirement of describing the slowest damped mode.

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