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Exciting black hole modes via misaligned coalescences: I. Framework and inspiral/plunge worldline computation[1] ANUJ APTE, SCOTT HUGHES, Massachusetts Inst of Tech-MIT — The final gravitational waves emitted in the coalescence of two black holes are quasi-normal ringing modes of the merged remnant. The amplitudes of these modes are determined by the mass ratio of the system and the geometry of the coalescence. To simplify the analysis, we consider a small mass ratio system consisting of a non-spinning body of mass μ that inspirals on a quasi-circular trajectory into a massive Kerr black hole. Our goal is to understand how different modes are excited as a function of the black hole spin and an angle θ_{inc} which characterizes the misalignment of the orbits angular momentum with the black hole spin axis. In this talk, we sketch an overview of the calculation we have undertaken and present the details of its first step, computing the worldline the smaller body follows as it inspirals and plunges into the larger black hole. Our approach generalizes earlier work by Ori and Thorne.

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