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Approximate methods for building extreme mass ratio inspiral waveforms SCOTT HUGHES, Massachusetts Institute of Technology — The "extreme mass ratio inspiral" (or EMRI) problem has captured much attention in recent years. This is due to its relevance at describing a potentially important gravitational-wave source, and to the elegance of techniques which are being developed to solve it. A complete, self-consistent solution to this problem will require detailed knowledge of the self-interaction of a small body orbiting a Kerr black hole, taken (at least in part) to second order. This challenge will consume much time and effort. In the meantime, there is an exigent need for waveforms which, though not correct in all details, are sufficiently reliable that they can be used to understand how to measure these waves with space-based gravitational-wave antennae. I will describe in this talk results from a crude but surprisingly effective "kludge" approximation. The kludge produces waves which match well with available strong-field results, requiring only a fraction of the computational effort. Motivated by how the kludge operates, I will argue that a good medium between the kludge and the full solution is a "hybrid" approach to waveform generation. This hybrid combines the best features of both time and frequency domain approaches to black hole perturbation theory, using them to make EMRI waves that are as accurate as is possible without incorporating self-force information.

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