Abstract Submitted
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A frequency-domain description for bound orbits of spinning bodies in curved spacetime[1] LISA DRUMMOND, SCOTT HUGHES, Massachusetts Institute of Technology — Very large mass ratio binary black hole systems are of interest as a clean limit of the two-body problem in general relativity, as well as their importance as sources for the Laser Interferometer Space Antenna (LISA). To leading order, the motion of the smaller body in such systems is a geodesic of the larger black holes spacetime. Accurate models of such systems require post-geodesic corrections to this motion. Post-geodesic effects that drive the small body away from the geodesic include gravitational self-force effects, and spin-curvature force, which arises from coupling of the small body's spin to the black hole's spacetime curvature. In this talk, we discuss new calculations of the impact of the spin-curvature force. Using the fact that the small bodys motion is close to a geodesic (in a sense that can be made precise) plus recent closed-form results (van de Meent 2019) describing precession of the small body's spin along black hole orbits, we develop a frequency-domain formulation of the motion which allows us to compute the spin-curvature correction to geodesic orbits. As an illustration of our results, we show how this correction yields high-precision shifts to the frequencies of orbital motion, which will importantly affect waveform models for LISA.

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