Interacting Geodesics: Binary Systems around a Black Hole.

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abstract

We present a novel method to study interacting orbits in a fixed mean gravitational field associated with a solution of the Einstein field equations. The idea is to consider the Newton gravity among the orbiting particles in a geometry given by the main source. We apply the technique in the study of two and three self-gravitating particles moving around a black hole, i.e., in a Schwarzschild geometry. We also compare with the equivalent Newtonian problem and noted differences in the structural stability, e.g., binary systems were found only in the general relativistic approach.