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Geodesic bilocal operators in Schwarzschild spacetime

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We present a unified formulation of geometrical optics in General Relativity. Consider two causally connected, locally flat neighborhoods. Suppose that each null geodesic originating in one neighborhood terminates at the other one, and the curvature along the trajectory is small enough, such that the linear geodesic deviation equation holds. Also, let the observation be performed by a number of nearby observers. One can show that all the optical observables like parallax and angular diameter distances are expressible in terms of bilocal geodesic operators (as defined in 1811.10284), which are functionals of the curvature along the line of sight, and the 4-velocities of the emitter and observer. In this talk, we present a complete solution of the geodesic deviation equation and use it to construct bilocal geodesic operators for Schwarzschild spacetime. Finally, we use these operators to study angular diameter and parallax distances as well as emitter-observer-velocity-independent distance slip (1912.04988).

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