

Gravitational Geometry and Dynamics Group Seminar

Friday, July 17, 2026, at 11h00.

Room: Sala Sousa Pinto and Teams ID: 335 229 984 801 786

(Password: contact h.sanchez@ua.pt)

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Black Hole Initiative

More about $Gr\odot v$
at: gravitation.web.ua.pt



Toward the Study of Photon Dynamics in Non-Separable Spacetimes

Black holes provide a unique laboratory for testing general relativity in the strong-field regime through observations such as black hole images and gravitational wave signals. Comparing theoretical predictions with these observations requires accurate numerical models of photon trajectories. This work develops and validates a generalized ray-tracing framework for computing null geodesics in stationary, axisymmetric spacetimes. Unlike many existing ray-tracing methods, the framework does not rely on metric separability or analytic solutions, allowing it to be applied to both separable and non-separable spacetimes. The framework is validated by reproducing known Schwarzschild and Kerr results before being applied to a quasi-Kerr spacetime as an initial demonstration of its broader applicability. This work provides a flexible framework for studying photon trajectories in more general spacetimes and lays the foundation for future observational tests of gravity.