

GRAVITATIONAL LENSING IN THE KERR SPACETIME GEOMETRY

Short list of problems/issues

- (1) No analytic description of relativistic caustics (except for the intersections on the equatorial plane.
- (2) No analytic description of gravitational lensing out of the equatorial plane.
- (3) No idea (analytical or numerical) for what happens to higher order caustics.
- (4) Is strong field gravitational lensing observable?
- (5) Analytical shape of the caustics in Strong Deflection Limit?
- (6) Gravitational lensing far from the equatorial plane in the Strong Deflection Limit?
- (7) Description of additional images in the Strong Deflection Limit?
- (8) What coordinates are best suited for Lensing in Kerr spacetime?
- (9) Projects for MAXIM?
- (10) Non-disk lensing events for MAXIM?
- (11) Gas trajectories in the accretion disk — fully GR code or MHD/Kerr?
- (12) Are the time delays the same for Kerr and “Shifted Schwarzschild”? To what order?
- (13) Are caustics/critical curves in first order strong field limit equivalent to “shifted Schwarzschild”?
- (14) Plotting the caustics from conjugate points: Which photons (light rays) form the caustics?
- (15) What does the lightcone look like?
- (16) Plot higher order caustic sheets numerically.
- (17) Plot primary caustic sheet for observer close to Black hole.
- (18) How do caustics look for observers outside the equatorial plane?
- (19) How are the astroid caustics formed?
- (20) Is the birth process of the astroid caustic sheet for Kerr stable?
- (21) Clarify GR definitions of twist/shear/convergence in terms of lensing definition.
- (22) Stability of caustics with respect to metric perturbations?
- (23) Are all stable caustic sheets lightlike?