Introduction to Black Hole Physics

Credit: 04

1. Spherically Symmetric Black Holes
    1. Spherically Symmetric Gravitational Field
    2. Schwarzschild–de Sitter Metric
    3. Global Structure of the Schwarzschild Spacetime
    4. Eddington–Finkelstein Coordinates
    5. Higher-Dimensional Spherical Black Holes

2. Particles and Light Motion in Schwarzschild Spacetime
    1. Equations of Motion
    2. Particle Trajectories
    3. Light Propagation
    4. Ray-Tracing in Schwarzschild Spacetime
    5. Black Hole as a Gravitational Lens

3. Rotating Black Holes
    1. Kerr Spacetime
    2. Ergosphere. Horizon
    3. Particle and Light Motion in Equatorial Plane
    4. Spinning up the Black Hole

4. Particles and Light Motion in Kerr Spacetime
    1. Geodesics in Kerr Spacetime: General Case
    2. Light Propagation
    3. Hidden Symmetries of Kerr Spacetime
    4. Energy Extraction from a Rotating Black Hole

Books: -

1. **Introduction to Black Hole Physics** by Andrei Zelnikov and Valeri P Frolov
   Online ISBN: 9780191731860 Print ISBN: 9780199692293
   Publisher: Oxford University Press

2. **The Mathematical Theory of Black Holes**, S. Chandrasekhar OUP UK
   ISBN:9780198863137