

Lecture # 13

Gravity: extra symmetry

$$\vec{A} = \vec{p} \times \vec{L} - \frac{GMm\vec{r}}{r^3}$$

∃ three conserved quantities

⇒ \vec{A} , \vec{L} can be eliminated from eqs. of motion

⇒ they can be solved algebraically

Kepler orbit $p = r(1 + e \cos \theta)$

$e < 1$ ellips

$e > 1$ hyperbola

Today

IV a) Collision

IV b) Scattering

IV c) Rutherford cross-section