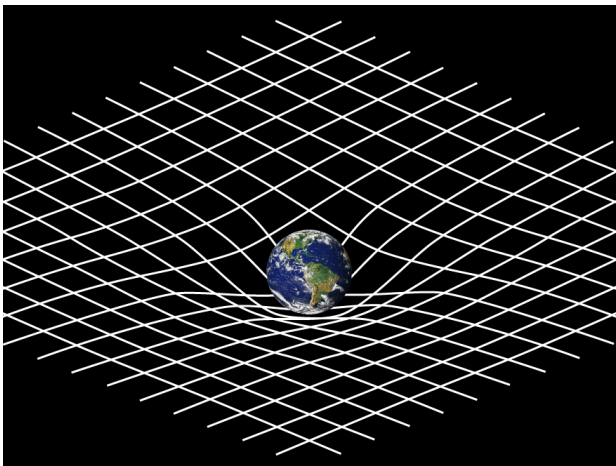


Physics Department Seminar

Apr. 4, Friday at 2 PM in Science Building Room 250

Elliptic Orbits for the Schwarzschild Metric

Alexander Mcpeck



Although most standard undergraduate physics curricula will introduce students to special relativity in a modern physics course, there are generally fewer opportunities for students to get exposure to general relativity. This is primarily due to the intensive mathematical prerequisites to study the field.

By studying a problem with a simpler mathematical framework, students can get exposure to mathematics common in general relativity, primarily elementary tensor analysis.

It can be shown that modeling the motion of a particle moving through spacetime is equivalent to finding the geodesic through spacetime for a given metric tensor. The Minkowski metric tensor corresponds to a particle in a vacuum, whereas the Schwarzschild metric corresponds to the two-body problem. The case for the Minkowski metric showcased linear motion when parameterized by time, and the case for the Schwarzschild metric resulted in an elliptic integral of the azimuthal angle parameterized with respect to radial distance.