2.1 Review of General Relativity

General relativity is a fundamental theory of gravitation developed by Albert Einstein in 1915. It describes the gravitational force as a result of the curvature of space-time caused by the presence of mass and energy. In general relativity, the force of gravity is not a force between masses, but rather a result of the geometry of space-time.[1]

The theory is based on the idea that matter warps space-time, and this warping affects the motion of other matter. This curvature of space-time is described by a mathematical object known as the metric tensor. Tensors encode the geometry of space-time. The motion of objects in this curved space-time is then described by the geodesic equation, which is essentially the equation of motion in curved space-time.[1]

One of the most important predictions of general relativity is the existence of black holes, which are regions of space-time where the curvature becomes so extreme that nothing can escape its gravitational pull, not even light. Another important prediction is the gravitational lensing effect, where light is bent by the curvature of space-time around massive objects.[1], [4]

General relativity has been extensively tested through various experiments and observations, including the bending of light around the sun during a solar eclipse, the precession of the orbit of Mercury, and the observation of gravitational waves.[10], [11]

Despite General Relativity's success, there are still open questions and challenges, such as the unification of general relativity with quantum mechanics and the problem of singularities in space-time.[4], [5]

Overall, this section serves as a foundation for the rest of the paper, providing the necessary background knowledge for readers to understand the modifications we propose to General Relativity in order to incorporate the additional dimensions of our 7-dimensional universe model. Let's look at the Field Equations.