

The possible existence of a massive spin-2 field alongside the standard massless graviton of General Relativity is a recent theoretical development in gravitational physics. If such an additional tensor field exists, it could leave potentially observable imprints in several astrophysical, cosmological and laboratory settings. This thesis studies the phenomenon of flavour oscillations in a nearly degenerate coupled system of photons with massive and massless spin-2 particles propagating in an external magnetic field. The framework for our calculations is provided by the ghost-free bimetric theory of gravity coupled to electromagnetism. We discuss several potentially observable manifestations of such oscillations and make numerical predictions for some relevant laboratory setups and astrophysical scenarios.