Abstract

A variety of observations suggests that the present universe is dominated by some unknown components. The distribution and properties of these components are the focus of modern cosmology and we are only beginning to understand them. Gravitational lensing, the bending of light in the gravitational field of a massive object, is one of the predictions of the general theory of relativity. Especially with recent and coming advances in observational data, the gravitational lensing is regarded as one of the most effective tools for probing a number of interesting phenomena of the universe. Some of these phenomena are the existence of various astrophysical objects like black holes, super-dense neutron stars, exotic matter, wormholes, naked singularities etc. The detection of these objects may eventually shed light on the possible connection between the quantum theory and gravity. Inspired by the latest result in the Sloan Digital Sky Survey Quasar Lens Search (SQLS) there are a lot of theoretical works concerning exotic objects. With some violation of the energy conditions, it is possible to combine scalar fields or other types of matter so as to build metrics that fall as $1/r^n$ asymptotically. This thesis aims at exploiting the existing gravitational lensing theory for non-Schwarzschild metrics to study a lensing system composed of two objects whose gravitational potential asymptotically falls as $1/r^n$, whether ordinary ($n < 1$) or exotic ($n > 1$).