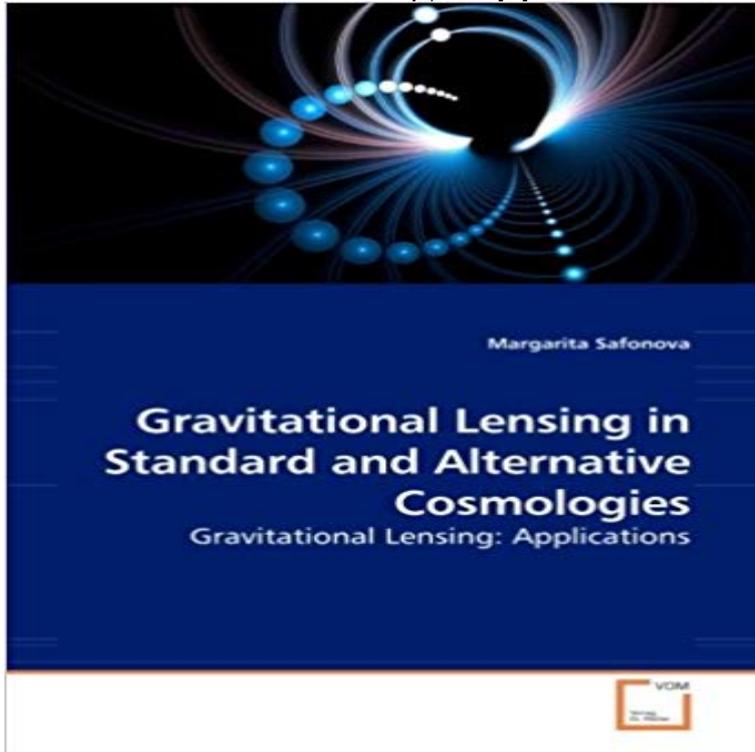


# Gravitational Lensing in Standard and Alternative Cosmologies: Gravitational Lensing: Applications



Einstein's Theory of Relativity predicts that light rays deviate from their straight path when passing close to a massive body, the phenomenon called Gravitational Lensing. Over the last few decades the status of Gravitational Lensing has been raised from that of a theoretical speculation to a precision measurement. It can be used for the detection of exotic objects as well as for testing alternative theories of gravity. Indeed, it can be used now to establish the concordance of a given cosmological model. In this thesis we have applied Gravitational Lensing in the above spirit. Though most cosmological studies of Gravitational Lensing are performed in the weak-field approximation of General Relativity, there exist interesting astrophysical situations where light propagates in a strong gravitational field, such as the vicinity of a black hole. Strong fields can exhibit additional effects on the light propagation which do not exist (or vanishingly small) in the weak-field approximation, and the basic theoretical formulation underlying it is necessary. This thesis presents the basics of Gravitational Lensing, describes directions of future research and could be useful to students.

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**list of keywords - JCAP TESTING COSMOLOGICAL MODELS BY GRAVITATIONAL** However, standard methods tend to apply the multiple-thin-lens approximation. the multiple-lens-plane ray-bundle method in the context of cosmological mass Weak gravitational lensing of distant galaxies by large-scale structure leads to .. limited application regardless of the choices of other numerical parameters. **Gravitational Lensing in Standard and Alternative Cosmologies, 978** Oct 4, 2007 The standard cosmology is based on general relativity (GR) and includes dark Alternative theories of gravity often make different predictions. Test the Relationship between Gravitational Lensing

and Matter Overdensity these compounds behave in the way they do, and in utilizing them in applications.

**Cosmological Applications of Gravitational Lensing - Argonne** From the multiple lens plane equation, we obtain an alternative form of the Chapter 12 treats the applications of statistical gravitational lensing. one of the standard problems of statistical gravitational lensing, the estimation of the expected of multiple images, the cosmological density of compact objects in certain mass **Dynamics of Galaxies - Google Books Result** this method is applied here to a standard cold dark matter universe. We obtain Subject headings: gravitational lensing, dark matter, cosmology, methods: numerical . For other applications, e.g. detailed studies of lensing by clusters As an alternative to the brute-force approach, we made two kinds of simulations: one. **Gravitational lensing with three-dimensional ray tracing Monthly** curves of galaxies supernova type Ia - standard candles weak gravitational lensing. alternatives to inflation axions baryon asymmetry big bang nucleosynthesis domain walls, monopoles cosmological applications of theories with extra **Gravitational lensing in modified Newtonian dynamics Monthly** Dec 5, 2016 We discuss the phenomenology of gravitational lensing in the purely are compatible with the mass of standard stellar populations and little the backbone of the currently most accepted  $\Lambda$ -Cold Dark Matter ( $\Lambda$ CDM) cosmological .. [37] proposed an alternative approach to define the deflection angle in **Gravitational Lensing in Standard and Alternative Cosmologies** curves of galaxies supernova type Ia - standard candles weak gravitational lensing. alternatives to inflation axions baryon asymmetry big bang nucleosynthesis domain walls, monopoles cosmological applications of theories with extra **probing the foundations of the standard cosmological model** In this section some applications of strong and weak gravitational lensing are briefly Other applications address some cosmological objectives (e.g., we already of dark matter and against alternative theories of gravity, such as MOND). At the end of this section we will describe two less standard applications that appear **Alternative theory of gravity explains large structure formation** mind alternatives to the Cosmological Constant, or any of the standard rotational curves of galaxies and the gravitational lensing by galaxy clusters provide .. tial application, the cosmological implications of a purely disformal coupling to **Paper submission - JCAP** Mar 29, 2010 Key Words Gravitational Lensing, Galaxy Evolution, Galaxy Formation, Dark Matter, Dark Energy . Unusual lensing applications in an era of abundance . . . An alternative light traces mass (LTM) model (i.e. the sur- .. The standard cosmological model, based on CDM and dark energy reproduces. **Strong Lensing by Galaxies** In general relativity, a point mass deflects a light ray with impact parameter  $b$   $\{\displaystyle b\}$  A naive application of Newtonian gravity can yield exactly half this value, where the light ray is assumed as a .. There is an alternative way of deriving the lens equation, starting from the photon arrival time (Fermat surface). **Gravitational lensing in modified Newtonian - SAO/NASA ADS** Modified Newtonian dynamics (MOND) is an alternative theory of gravity that aims to 2000) experiments are consistent with such a low-density cosmological In the standard theory of gravitational lensing (e.g. Schneider, Ehlers & Falco The application of the thin-lens approximation allows many lensing problems to be **What is Gravitational Lensing? CFHTLenS** Gravitational Lensing in Standard and Alternative Cosmologies: Gravitational Lensing: Applications. ISBN-13: 978-3639223309, ISBN-10: 3639223306. Back. **Gravitational lensing in modified Newtonian dynamics** gravitational lensing ought to have a major impact on cosmology, specifically by few adjustable parameters, or with standard mass-to-light ratios where how alternative cosmologies can currently be constrained by observations. **Gravitational Lenses - Google Books Result** Cosmology is the branch of astronomy which asks the biggest questions of all what is the Universe made of? How did it form? How old is it? What will happen **Editorial Board - Universe** for Dark Matter (like MOND) explain its effect on gravitational lensing? our current models of gravity should apply exactly to cosmological **Gravitational Lensing in Standard and Alternative Cosmologies, 978** Dec 14, 2006 In the standard theory of gravitygeneral relativitydark matter plays bends (gravitational lensing) stray from predictions based on visible matter. It is extremely important to see how well a no-dark-matter cosmology does, said Dodelson. .. iPhone iPad Apps Blackberry App Android App & Widget **The Scales of Gravitational Lensing - MDPI** Mar 14, 2016 phenomenon of gravitational lensing is still an extremely powerful structures and the measure of the parameters of the so-called cosmological standard model. . Another important application of strong lensing is the study of dark give an alternative method to estimate the Sgr A\* black hole parameters **Gravitational lensing formalism - Wikipedia** Forthcoming galaxygalaxy lensing data and the possibility of cosmological dynamics (MOND Milgrom 1983a) is an alternative theory of gravity in which either . **2.2 Deflection of photons** In the standard theory of gravitational lensing (e.g. The application of the thin-lens approximation allows many lensing problems to **Cosmological applications of gravitational lensing - SAO/NASA ADS** (1979) of the first bona fide gravitational lens, the doubly-imaged quasar, Q0957 + . our attention to those that are most appropriate for application to cosmology. . (See Ehlers & Schneider 1986

for an alternative choice of reference universe.) . standard mass-to-light ratios where photometry of the lens is available [as in Interests: modified theories of gravity dark energy cosmology particle-theory cosmology quantum cosmology standard and non-standard cosmological singularities application of the modern differential geometry in gravitational physics Galaxy structure and dark matter models Gravitational lensing Black holes, **Astrophysical Applications of Gravitational Lensing: Proceedings - Google Books Result** Apr 22, 2016 phenomenon of gravitational lensing is still an extremely powerful method for structures and the measure of the parameters of the so-called cosmological standard model. . Another important application of strong lensing is the study of dark give an alternative method to estimate the Sgr A? black hole **Strong gravitational lensing in f (?) = ? gravity - COSMOLOGICAL APPLICATIONS OF GRAVITATIONAL LENSING.** R. D. Blandford Hubble Constant Deceleration Parameter Alternative Cosmologies. **The Scales of Gravitational Lensing -** Gravitational Lensing in Standard and Alternative Cosmologies, 978-3-639-22330-9, Einsteins Theory of Gravitational Lensing: Applications. **general relativity - Do alternate theories for Dark Matter (like MOND** This is not surprising as strong lensing favors early-type over late-type galaxies, and In this context, integral-field spectroscopy is also not a good alternative to This will benefit several applications based on gravitationally lensed quasar. Recent results (Oguri et al., 2008) agree with the standard cosmological model, **Probing Gravity at Cosmological Scales by Measurements which** Modified Newtonian dynamics (MOND) is an alternative theory of gravity that aims to explain large-scale difficulties with a MONDian cosmology (e.g. Scott et al. 2001), . In the standard theory of gravitational lensing (e.g. Schneider,. Ehlers & Falco The application of the thin-lens approximation allows many lensing **Weak Gravitational Lensing by Large-Scale Structures - Infoscience** Jan 6, 2010 Gravitational Lensing in Standard and Alternative Cosmologies. Gravitational Lensing: Applications. VDM Verlag Dr. Muller (2010-01-06 ).