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**Gravitational lensing in astronomy.** (English) [Zbl 1016.85500]  

Summary: Deflection of light by gravity was predicted by General Relativity and observationally confirmed in 1919. In the following decades, various aspects of the gravitational lens effect were explored theoretically. Among them were: the possibility of multiple or ring-like images of background sources, the use of lensing as a gravitational telescope on very faint and distant objects, and the possibility of determining Hubble’s constant with lensing. It is only relatively recently, (after the discovery of the first doubly imaged quasar in 1979), that gravitational lensing has become an observational science. Today lensing is a booming part of astrophysics.

In addition to multiply-imaged quasars, a number of other aspects of lensing have been discovered: For example, giant luminous arcs, quasar microlensing, Einstein rings, galactic microlensing events, arclets, and weak gravitational lensing. At present, literally hundreds of individual gravitational lens phenomena are known.

Although still in its childhood, lensing has established itself as a very useful astrophysical tool with some remarkable successes. It has contributed significant new results in areas as different as the cosmological distance scale, the large scale matter distribution in the universe, mass and mass distribution of galaxy clusters, the physics of quasars, dark matter in galaxy halos, and galaxy structure. Looking at these successes in the recent past we predict an even more luminous future for gravitational lensing.

A small amendment was made in August 2002.

**MSC:**

85-05 Experimental work for problems pertaining to astronomy and astrophysics  
85A04 General questions in astronomy and astrophysics  
83B05 Observational and experimental questions in relativity and gravitational theory

**Full Text:** DOI [arXiv](https://arxiv.org/) [EuDML](https://eudml.org/) Link

**References:**


6. Alcock, C.; Axelrod, CW; Allsman, RA; Axelrod, TS; Bennett, DP, Possible gravitational microlensing of a star in the Large Magellanic Cloud, Nature, 365, 621 (1993); doi:10.1038/365621a0


[210] doi:10.1086/114608


[208] doi:10.1086/185884

[207] Swings, JP, Quasars and Gravitational Lenses (1983), Liège, Belgium: Université de Liège, Institut d’astrophysique, Liège,

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