Editorial

New Highlights in Gravitationally Lensed Quasar Research

Just thirty years after the discovery of the first gravitationally lensed quasar is a good opportunity to summarize some recent advances in the field, and to attract the attention of students and senior astronomers about its potential. Once the standard scenario has been tested on more than 100 gravitationally lensed quasars: several images of a background quasar are produced by an intervening massive galaxy (or association of galaxies), several current efforts focus on the exploration of new kinds of lenses (apart from galaxies), the composition and structure of lensing galaxies, the nature and structure of lensed quasars, and the involved cosmological model.

This special issue includes a review of cosmic strings and their gravitational lens effects by one of the most prominent groups worldwide studying this kind of cosmic objects. Although there are no confirmed cosmic strings and their gravitational lensing signatures were never observed, the possible detection of these objects would represent a historical step toward understanding the composition and evolution of the Universe. Observations over the last two decades, however, have revealed that many multiply imaged quasars are microlensed by stars in lensing galaxies. In this volume, it is reviewed the state-of-art in computational microlensing. New advances in the area will have a big impact on our understanding of quasar and dark matter physics in the coming years. Time domain studies of lensed quasars are also promising tools to reveal the nature and structure of these distant sources. Modern dedicated or robotic 1-2 m class optical telescopes and sophisticated data reduction methods allow astronomers to obtain accurate light curves, and in some cases, to unambiguously detect intrinsic variations. Two independent contributions in this special issue show evidence supporting a reverberation/reprocessing scenario in lensed quasars at $1 < z < 3$.

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