

SEARCH FOR GRAVITATIONAL LENSING SIGNATURES IN LIGO-VIRGO BINARY BLACK HOLE EVENTS

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ABSTRACT

Gravitational lensing phenomena are widespread in electromagnetic astrophysics, and in principle may also be uncovered with gravitational waves. Recent studies are showing that second generation gravitational-wave detectors may observe more than one lensed events. We present the results from a search for signatures of gravitational lensing in the binary black hole events detected by Advanced LIGO and Virgo during their first two observational runs. In particular, we look for three effects: 1) evidence of lensing magnification in the individual signals due to galaxy lenses, 2) evidence of multiple images due to strong lensing by galaxies, 3) evidence of wave optics effects due to point-mass lenses. We find no compelling evidence of any of these signatures in the observed gravitational wave signals. However, as the sensitivities of gravitational-wave detectors improve in the future, detecting lensed events will represent a major milestone in gravitational-wave astronomy.