Contribution ID: **61** Type: **Invited/Solicited talk in mini-symposium**

Strongly Lensed Transient Sources

Thursday, December 14, 2023 4:40 PM (25 minutes)

The past decades have witnessed a lot of progress in gravitational lensing with two main targets: stars and galaxies (with active galactic nuclei). The success is partially attributed to the continuous luminescence of these sources making the detection and monitoring relatively easy. With the running of ongoing and upcoming large facilities/surveys in various electromagnetic and gravitational-wave bands, the era of time-domain surveys would guarantee constant detection of strongly lensed explosive transient events, for example, supernovae in all types, gamma ray bursts with afterglows in all bands, fast radio bursts, and even gravitational waves. Lensed transients
have many advantages over the traditional targets in studying the Universe, and magnification effect helps to understand the transients themselves at high redshifts. In this talk, on base of the recent achievements in literature, I summarize the methods of searching for different kinds of lensed transient signals, the latest results on detection and their applications in fundamental physics, astrophysics, and cosmology. At the same time, I give supplementary comments as well as prospects of this emerging research direction that may help readers who are interested in entering this field.

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Session Classification: Gravitational Lensing