Time Delay Estimation: Overview

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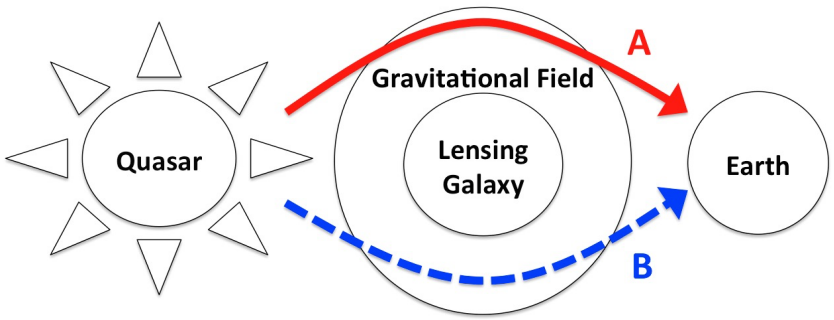

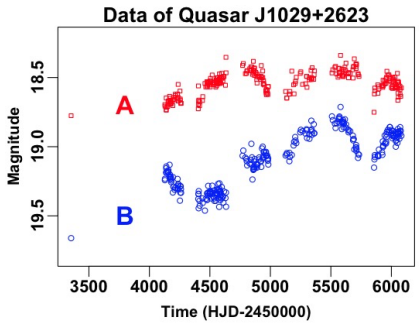

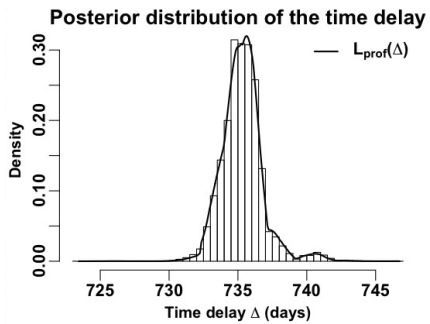

The gravitational field of an intervening galaxy acts as a strong lens deflecting quasar light rays to the Earth. **Time delay** is the difference between their arrival times. Time delay estimates can be used to constrain cosmological parameters, e.g., H_o.

- **Goal**: We aim to estimate time delays on large scale data (LSST).
- **New ideas**: (1) Damped random walk to model fluctuations in data; (2) m^{th}-order polynomial regression to model a difference between microlensing trends; (3) Profile-likelihood-guided Bayesian method.
- **Important results**: In the Time Delay Challenge, we achieved the best precision, analyzing the 2nd most simulations of the 4th rung.