A Bayesian Algorithm for Real-time Model Selection in Caustic-crossing Events

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Abstract: We present a full Bayesian algorithm designed to perform automated searches of the parameter space of caustic-crossing binary-lens microlensing events. This builds on previous work implementing priors derived from simple Galactic models and geometrical considerations. The geometrical structure of the priors divides the parameter space into well-defined boxes that we explore with multiple Monte Carlo Markov Chains. We test our automated search scheme using two data sets: a synthetic lightcurve, and the observations of OGLE-2007-BLG-472 that we analysed in previous work. We show that the introduction of priors and minimisation of the BIC, rather than simple maximum likelihood, can help favour more plausible lens models.