[구ST-01] Characterization of the Resonant Caustic Perturbation

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Four of nine exoplanets found by microlensing were detected by the resonant caustic, which represents the merging of the planetary and central caustics at the position when the projected separation of a host star and a bounded planet is s~1. One of the resonant caustic lensing events, OGLE-2005-BLG-169, was a caustic-crossing high-magnification event with A_max ~ 800 and the source star was much smaller than the caustic, nevertheless the perturbation was not obviously apparent on the light curve of the event. In this paper, we investigate the perturbation pattern of the resonant caustic to understand why the perturbations induced by the caustic do not leave strong traces on the light curves of high-magnification events despite a small source/caustic size ratio. From this study, we find that the regions with small magnification excess around the center of the resonant caustic are rather widely formed, and the event passing the small-excess region produces a high-magnification event with a weak perturbation that is small relative to the amplification caused by the star and thus does not noticeably appear on the light curve of the event. We also find that the positive excess of the inside edge of the resonant caustic and the negative excess inside the caustic become stronger and wider as q increases, and thus the resonant caustic-crossing high-magnification events with the weak perturbation occur in the range of q $\leq$ 10-4. We determine the probability of the occurrence of events with the small excess $|\varepsilon| \leq 3\%$ in high-magnification events induced by a resonant caustic. As a result, we find that for the Earth-mass planets with a separation of ~ 2.5 AU the resonant caustic high-magnification events with the weak perturbation can occur with a significant frequen

[구ST-02] Korean-Japanese Planet Search Program: Search for Planets around G-type Giants

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Korean-Japanese Planet Search Program has been carried out since 2005 to search for planets around intermediate-mass giant stars (1.5-5.0 solar masses) by an international collaboration between Korean and Japanese researchers. In this program, we have been carrying out a precise radial velocity survey of about 190 G-type giant stars (6.2<V<6.5) using 1.8m telescope at Bohyunsan Optical Astronomy Observatory (BOAO, Korea) and 1.88m telescope at Okayama Astrophysical Observatory (OAO, Japan).

Among many planet candidates detected by our survey, we discovered a brown dwarf-mass companion with a semimajor axis of 1.71 AU and a minimum mass of 37.6 Jupiter masses, and a very promising planet candidate with a semimajor axis of 0.78 AU and a minimum mass of 1.8 Jupiter masses. The brown dwarf-mass companion and the planetary candidate are orbiting massive intermediate-mass stars with masses of 3.9 and 2.5 solar masses, respectively. They are the most massive substellar companion and the lowest mass planet ever discovered within 3 AU of massive intermediate-mass (>1.9 solar masses) giant stars. These results extend the planet mass distribution of massive intermediate-mass stars to higher and lower mass region, and may further constrain substellar system formation mechanisms. We report the recent results and current status of Korean-Japanese Planet Search Program