

重力マイクロレンズによる系外惑星探査 Gravitational Microlensing exoplanet search

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Gravitational microlensing has a unique sensitivity to exoplanets outside the snow-line down to the Earth-mass, where the planetary formation is very active. The MOA-II carries out microlensing exoplanet search toward the Galactic Bulge in New Zealand. We detect about 4 exoplanets among about 600 microlensing events every year including the Jupiter-Saturn analog and Neptune analog. We derive the planet/star mass ratio function. The PRIME (PRime-focus Infrared Microlensing Experiment) project is planning to conduct the microlensing survey toward the central region of the Galactic bulge in H-band by using new 1.8m wide FOV telescope in South Africa for the first time. The Wide Field Infrared Survey Telescope (WFIRST) is the NASA's future large space mission, which is scheduled to be launched in 2025. The exoplanet microlensing program is one of the primary science of WFIRST. WFIRST will find about 3000 exoplanets by the high precision continuous survey with 15 min. cadence, which is sensitive to all the solar system analogs except the mercury. WFIRST can complete the statistical census of planetary systems in the Galaxy, from the outer habitable zone to the outside of the snow-line and gravitationally unbound planets –a discovery space inaccessible to other exoplanet detection techniques.

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