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Status Report of Subaru Strategic Exploration of Exoplanets and Disks (SEEDS)

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Since the first detection of exoplanets orbiting normal stars in 1995, many exciting discoveries have been made, but our understanding of planetary systems and their formation is far from complete. A census of companions to stars over a wide range of ages will provide important clues to the formation and evolution of stars, brown dwarfs, and planets. Armed with a much better performance than that of the CIAO+AO36 combination, SEEDS is the first Subaru Strategic Observations to conduct the HiCIAO+AO188 imaging survey searching for giant planets (1 Jupiter mass (MJ) < mass < ~13MJ) as well as protoplanetary/debris disks at a few to a few tens of AU regions around ~500 nearby solar-type or more massive young stars. The ages of our exoplanet target stars span ~1-10 Myr for YSOs in nearest star forming regions, through ~100-500 Myr old stars in nearby open clusters, to ~1 Gyr old nearby stars. The protoplanetary disk targets are the YSOs in nearby star forming regions, while the debris disk candidates include both well known and newly discovered ones from Spitzer/AKARI satellites. As demonstrated with recent successes of direct imaging of planetary mass objects around both A stars and a G star, direct imaging is indispensable for the detection of such "young" planets, especially planets beyond the snowline (4-40AU), which is complementary to radial velocity searches. The goals of our survey are to address the following key issues in exoplanet/disk science: (1) the detection and census of exoplanets in the outer circumstellar regions around solar-mass stars and massive stars, (2) the evolution of protoplanetary and debris disks including their morphological diversity, and (3) the link between exoplanets and circumstellar disks. The completeness and uniformity of this systematic survey will provide important statistical, or even useful null, results to be obtained as well as enabling the study of individual objects of particular interest.

The first run successfully started in the last October. In this talk, we will report the status of the project and the first results.

Keywords: Exoplanets, Giant planets, Direct imaging, High contrast