INTRODUCTION

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"Are we alone in the universe?" is one of the most fundamental questions for us, human beings. Today astronomers are challenging to answer this question, by searching for other worlds in the Galaxy, in other words, extrasolar planets that are planets outside our solar system. An extrasolar planet around a solar-type star was first discovered in 1995, by observing the wobble of its host star by its gravity. It was the beginning of a new era of astronomy. Since then, more than 240 extrasolar planets have been found around stars with various masses and on various evolution stages. Due to the observational selection effect, most extrasolar planets found so far have large masses and relatively smaller orbital radii or semimajor axes. We think that from their large masses, most of them are gas giant planets like Jupiter that mainly consists of hydrogen gas. Some of them may include ice giant planets like Neptune that mainly consists of mixture of H_2O, NH_3, and CH_4 ices. The orbits of these planets show large diversity: some have orbital radii smaller than that of Mercury and others have eccentricities as large as that of comets. Planets with orbital radii smaller than about 0.1 AU are called "hot Jupiters" or "hot Neptunes" depending on their masses. Planets with large eccentricities are sometimes called "eccentric planets." Now theorists are working on the origin of these extraordinary planets that are very much different from the planets in our solar system. From the observational point of view, the next target is, of course, terrestrial or rocky (Earth-like) planets. We have already started projects to search for terrestrial planets such as COROT, Kepler, and TPF (Terrestrial Planet Finder) missions. They are expected to find "habitable" or life-supporting planets where we can expect the existence of life.

In this session, we review the latest results of observation of Extrasolar planets and their significance in understanding the origin and evolution of planetary systems. We also introduce future plans to discover Earth-like planets and discuss their impacts in various aspects.