Earth and Space Science

Date: July 6 2:00-3:00 pm (JST)

Observations of Exoplanets by using the Gravitational Microlensing

Abstract:

We do not yet know how the Earth and solar system were formed. We did not even know if there are planets around the other stars 30 years ago. Since the first discovery of an extrasolar planet, i.e., exoplanet, around a Sun-like star in 1995, more than 5000 exoplanets are discovered. We learned that there is a variety of exoplanets, but we have not yet discovered the second Earth around a Sun-like star. Most of the discovered exoplanets are hot and warm, and larger than Earth, because they are relatively easy to be detected. On the other hand, cold planets like Jupiter, Neptune, and Uranus in our solar system are difficult to be detected.

Infrared Astronomy Group is conducting a microlensing planet survey by using the MOA-II telescope in New Zealand to find cold planets around the other stars. Our team discovers about 10 new, cold exoplanets every year by collaborating with other research groups. To increase the number of planet detections and unveil how many cold planets (ranging from super-Jupiter to earth-size planet) exist around a star, we are constructing a new near infrared telescope, the PRIME telescope, in South Africa.

In this talk, I will briefly summarize the exoplanet observations with various methods and introduce gravitational microlensing, which is the method our group uses to find exoplanets. Also, I will introduce what we learned from our observational data. Finally, I will talk about the PRIME project and planned future space telescope missions.

Speaker: *Daisuke Suzuki*

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Earth and Space Science

Date: July 5 5:00-6:00 pm (JST)

Ubiquity and mystery of granular phenomena

Our everyday lives are surrounded by collections of small solid grains. For instance, materials of breakfast are granular matter. Specifically, rice, wheat, coffee beans are typical granular matter (collections of grains). When we go out, we realize that the natural ground consists of soil grains. As well-known, most of the land surface of the earth is covered by sand (granular matter) as desert. This feature is not limited to the earth. Actually, most of the solid bodies in the solar system are covered by solid grains. Therefore, we have to understand the physical behavior of granular matter to understand the landscape development on various planetary bodies including our earth. Granular matter also relates to various industrial problems as well. Typically, mining industry and pharmaceutical industry are concerned with the handling technology of granular matter. If we find an efficient (energy-saving) way to handle granular matter, its economic impact is huge. However, the fundamental aspects of such important material should be revealed prior to various applications. To reveal the fundamental properties of such ubiquitous granular matter, granular physics has been developed. Although the granular matter is ubiquitous and simple, it sometimes shows very counterintuitive phenomena as well. Ubiquity and mystery of granular matter will be introduced in this presentation.

Speaker: *Hiroaki Katsuragi*

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