

Lecture Series “*Frontiers in Science*”

Prof. JiHyun Kim

IREC, Osaka Metropolitan Univ.

Title: Frontiers in Cosmic Ray Physics

Date & Time: June 8 (Mon) 16:45~18:15

June 9 (Tue) 16:45~18:15

June 22 (Mon) 16:45~18:15

June 23 (Tue) 16:45~18:15 (Discussion)

Venue : Sci. Bldg. E108 (Sugimoto C.)

Cosmic rays are energetic charged particles that impinge upon Earth’s atmosphere from outer space. They have been observed over an extremely wide energy range, from 10^9 eV to beyond 10^{20} eV. As messengers of high-energy astrophysical phenomena, cosmic rays provide valuable insights into some of the most extreme environments in the universe. This lecture series offers graduate students from all backgrounds an introduction to cosmic ray physics, covering key concepts, detection methods, and open questions in the field. We begin with the origin, composition, and energy spectrum of cosmic rays, exploring their astrophysical sources and propagation through the universe. We also examine detection techniques—from balloon-borne, satellite, and space station instruments to large ground-based observatories. Finally, we highlight ultra-high-energy cosmic rays, their mysterious origins, and their role in multi-messenger astrophysics.



**School of Science /
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