International Center for Hadron Astrophysics
ICEHAP CHIBA UNIVERSITY

ICEHAP Seminar

Date Apr. 4 Friday 14：00～16：00

Location ICEHAP Office (Engineering Research Bldg.1 Room609-1)

By Dr. Ellis Owen (RIKEN, Special Postdoctoral Researcher fellow)

Title

『From Galaxies to Cosmological Structures: The Multi-Scale Influence of Cosmic Rays』

Abstract

Cosmic rays interact with astrophysical systems over a broad range of scales. They go hand-in-hand with violent, energetic astrophysical environments, and are an active agent able to regulate the evolution and physical conditions of galactic and circum-galactic ecosystems. Depending on their energy, cosmic rays can also escape from their galactic environments of origin, and propagate into larger-scale cosmological structures. In this talk, I will discuss the impacts of cosmic rays retained in galaxies. I will show they can deposit energy and momentum to alter the initial conditions of star-formation, modify the circulation of baryons around galaxies, and have the potential to regulate long-term galaxy evolution. I will highlight some of the astrophysical consequences of contained hadronic and leptonic cosmic rays in and around galaxies, and how their influence can be probed using signatures including X-rays, gamma-rays and neutrinos. I will also discuss what happens to the cosmic rays that escape from galaxies, including their interactions with the magnetized large-scale structures of our Universe, and the fate of distant high-energy cosmic rays that do not reach us on Earth.