# Astronomy Colloquium

**Dr. Chao Zhang**

**Peking University/Nanjing University**

**Progress towards the next-generation detection of ultrahigh-energy particles**

**Time:** 10:00-11:00, 25 September (Wednesday), Shanghai time

**Venue：** N600（TDLI）

**Host:** Hao Zhou (周浩)

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**Meeting ID:** 779235260

## Abstract:

After decades of technical difficulties, the principle of radio emission from cosmic rays was improved by the discovery of the Askaryan effect in 2002. This effect, along with the geomagnetic transverse current, was able to accurately explain experimental data. As a result, radio detection of cosmic rays was finally reborn, matured rapidly over the last two decades, and recognized as a key technique for the next generation of ultra-high energy particle detection. Subsequently, dozens of experimental projects were proposed. In recent work, we have discovered a third fundamental radiation effect. This effect becomes prominent in very inclined and upward-going air showers, and is expected to change detection strategies. On the experimental front, GRAND, AugerPrime Radio, IceCube-gen2, BEACON and the other radio experiments are engaged in intense competition. So, this report also addresses recent technological progress and challenges and look ahead to potential approaches for future experiments.

## Biography:

Dr. Chao Zhang finished his study in Wuhan and Lyon and obtained his PhD degree in astroparticle physics at Hamburg University, Germany. He joined later the Helmoholtz-OCPC post-doc program at KIAA@PKU and IAP@KIT. He has worked at LPNHE@Sorbonne University, PMO and Nanjing University as a long-term visiting researcher. As a member of the Giant Radio Array for Neutrino Detection (GRAND) project, his recent work focuses on developing simulation and analysis tools for radio detection. In his work, he has discovered the gyosynchrotorn-like emission, the 3rd fundamental radio emission mechanism from cosmic ray air showers.