



**黃振崗博士**

**Dr. Chen-Kang Huang**

**Institute of Atomic and Molecular Sciences,  
Academia Sinica**

## ***Ultrafast dynamics of an intense laser ionized plasma***

**Date: 2023/12/14 (Thu)**

**Venue: S4-208**

**Time: 11:00-12:00**

### **Abstract:**

Since the advent of high-power pulsed lasers, significant amount of attention has been drawn to a laser-induced plasma due to its numerous applications in plasma-based accelerators, radiation generation, and controlled fusion. In the process called optical-field ionization, a plasma with an anisotropic and non-thermal electron distribution can be initiated in a predictable manner. Such a plasma is unstable and highly susceptible to various plasma kinetic instabilities, including electrostatic (streaming) and electromagnetic (filamentation and Weibel) ones, that contribute to the eventual thermalization of the plasma along with collisions. In this talk, I will discuss several transient phenomena in the non-equilibrium initial plasmas that have been discovered using theory, computer simulations, and experiments. These phenomena include the density waves corresponding to the electrostatic unstable modes and the self-organized magnetic field resulting from the thermal Weibel instability. Another transient effect associated with the absorption of optical angular momentum from the ionizing laser leads to the formation of coherent spiral structures in the spatial distribution of plasma density and fields. These findings provide new insights on the transient states of intense laser ionized plasmas right after their production.