



**THE CHINESE UNIVERSITY OF HONG KONG**  
**Department of Physics**  
**SEMINAR**

# **The Impact of Intergalactic Medium and Halos on Reionization**

*by*

**Dr. Tsang Keung CHAN (陳增強博士)**  
**Department of Physics**  
**Durham University, UK**

*Date: October 31, 2022 (Monday)*

*Time: 3:30 - 4:15 p.m.*

*Place: Rm. G25, Science Centre North Block, CUHK*

**ALL INTERESTED ARE WELCOME**

\*\*\*\*\*

---

## **Abstract**

Reionization refers to a cosmic event where the neutral intergalactic medium (IGM) was ionized by luminous galaxies and quasars. This event is central to galaxy evolution and cosmic structure, so it is the main focus of many observations, including JWST and SKA. However, the progress of reionization depended on the sinks of ionizing photons. Dense gas in the IGM and halos absorb more photons due to fast recombination. To understand them, we required high resolution cosmological simulations with radiation hydrodynamics. To achieve this, I used my novel, adaptive, and efficient radiation hydrodynamics method, SPH-M1RT. I have coupled this method to the state-of-the-art cosmological simulation code, SWIFT. We find that minihalos (halos with virial temperature below 104 K) can be important sinks, although they photo-evaporate within around 100 Myr. These sinks boost the required reionization photon budget by 20-100%, depending on the reionization redshift and photo-ionization rates. Finally, I will discuss other applications and recent developments of SPH-M1RT in astrophysical simulations.