第 68 回
RESCEU コロキウム

東京大学大学院理学系研究科　附属ビッグバン宇宙国際研究センター

日　時：2025 年 1 月 10 日（月）13：00 ～14：30

場　所：理学部 4 号館 1 階ピロティ　RESCEU セミナー室

講　師：Aswin Vijayan 氏（University of Sussex）

The early Universe through the FLARES

(First Light And Reionisation Epoch Simulations) lens

Abstract

Understanding the formation and evolution of the first galaxies is a key priority for many current and upcoming observatories, including ALMA, ELT, Euclid, HST, JWST, Roman Space Telescope, and SKA. This objective has also driven significant theoretical advancements, particularly using hydrodynamical simulations of galaxy formation and evolution. However, current available flagship periodic cosmological simulations such as Illustris-TNG or EAGLE are ill suited to do this, due to their small volumes and thus relative lack of bright rare galaxies in the early Universe. To overcome this, we have carried out a suite of zoom simulations targeting a range of overdensities in the EoR from a 3.2Gpc a side dark matter only box, termed the First Light And Reionisation Epoch Simulations (FLARES). This strategy yields more than an order of magnitude more massive galaxies than EAGLE. Composite distribution functions like the stellar mass function and luminosity functions, representative of the full parent volume, are derived using a novel weighting scheme. The increased dynamic range probed by FLARES allows us to make predictions for a number of large area surveys that will probe the EoR in coming years, such as the Euclid and Nancy Grace Roman Space Telescope as well as JWST. In this talk I will introduce the FLARE simulations, whose galaxies we have forward modelled into the observed space for an apples-to-apples comparison with the observational results. I will walk you through some of the successes of the model, how dust plays an important role in shaping our understanding even in the early Universe as well as the observational parameter spaces that will help to discard models of the early Universe. I will also provide a brief glimpse into an open source package to forward model simulated galaxies, called ‘synthesizer’, which we have been developing for more than 2 years. I will also briefly show plans for the next generation of FLARES runs with an updated physics model.

興味をお持ちの方の聴講を歓迎致します。