日　時：　2019 年 3 月 13 日(水) 14:00 ～15:00

場　所：　理学部 4 号館 1 階ピロティ RESCEU セミナー室

講　師：　Tilman Troester 氏 (University of Edinburgh)

Weak gravitational lensing, baryons, and deep learning

　Baryonic processes that alter the large-scale distribution of gas, and thus the matter power spectrum, such as AGN feedback, are one of the main systematics in current and future weak lensing surveys. Left uncorrected, these effects will bias the inferred properties of dark matter and dark energy that these surveys are designed to measure. Characterising the distribution of gas is thus of vital importance if these surveys are to be exploited to their full potential.

　In this talk, I will present ongoing work on joint analyses of weak lensing and tracers of diffuse gas, specifically the tSZ effect. We measure the tomographic cross-correlations between the tSZ effect and preliminary weak lensing data from the KiDS-1000 data set. We model the signal with a new code, based on HMCode, that can jointly predict the matter and pressure distributions and thus fit cosmology and parameters describing baryonic effects, such as the strength of AGN feedback, at the same time. I will then show how a joint analysis of cosmic shear and tSZ cross-correlations breaks degeneracies of the individual probes and can significantly improve the constraints on cosmological parameters compared to cosmic shear alone.

　Finally, I will show how we use a class of machine learning methods — deep generative models — to augment N-body simulations with gas. Specifically, I will show how conditional variational autoencoders and generative adversarial networks trained on the BAHAMAS hydrodynamical simulations can be used "paint" pressure fields on the SLICS suite of N-body simulations to produce consistent lensing and tSZ maps for use in the estimation of the cross-correlation covariance.

　　　　興味をお持ちの方の聴講を歓迎致します。お茶とお菓子を用意しております。