THE UNIVERSITY OF HONG KONG

DEPARTMENT OF PHYSICS
RESEARCH SEMINAR

Accurate Kappa Reconstruction Algorithm for masked shear catalog in weak lensing

Dr. Yuan SHI

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Abstract:

I present the Accurate Kappa Reconstruction Algorithm (AKRA), a prior-free maximum-likelihood framework that reconstructs the convergence field directly from masked and noisy shear catalogs. AKRA incorporates complex survey geometries into the inversion and yields unbiased, high-accurate mass maps across realistic survey footprints, enabling precise measurements of non-Gaussian statistics such as peaks, voids, and higher-order moments. I will show the first applications of AKRA to HSC Y1 and DES Y3 data, and discuss its extension to cluster-scale weak lensing reconstruction and upcoming surveys including CSST and Euclid.

Biography:

Yuan Shi is a postdoc at the Department of Astronomy, Shanghai Jiao Tong University. During her PhD at the National Astronomical Observatories, Chinese Academy of Sciences (NAOC), she developed wide-field imaging algorithms for radio interferometry, including mapmaking pipelines for the Discovering the Sky at the Longest wavelengths (DSL) lunar orbit array and extraction of the 21 cm global signal.

Her current research centers on solving inverse problems in observational cosmology, with a focus on reconstructing sky signals from incomplete and noisy data. She is the lead developer of the AKRA (Accurate Kappa Reconstruction Algorithm) series, a prior-free maximum-likelihood framework for weak-lensing mass mapping on the curved sky that has been applied to Subaru HSC Y1 and DES Y3 data.

Tuesday, April 28, 2026, 1:00pm

Room 522, 5/F, Chong Yuet Ming Physics Building, The University of Hong Kong

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Anyone interested is welcome to attend.