You are welcome to nominate speakers to colloquium@nao.cas.cn. The video and slides of previous colloquia and more information can be found at http://colloquium.bao.ac.cn/.

国台学术报告 NAOC COLLOQUIUM

2020 年 第 2 次 / No. 2 2020

Time: Monday **2:30 PM,** Oct. **12th** **Location:** **A601, NAOC**

Testing modifications of gravity from galaxy motions on cosmological scales

Prof. Jianhua He

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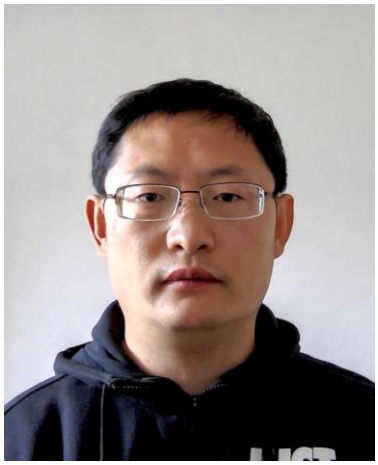
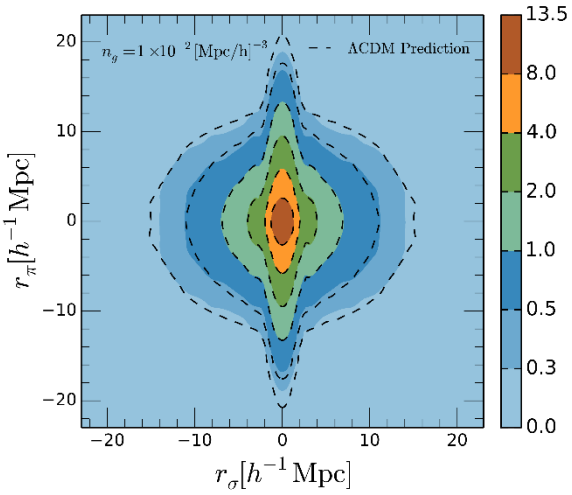


Dr. He got his B.S. from ShangHaiJiaoTong University in 2006 and then obtained Ph.D at Fudan University in 2011. He worked as a post-doc from 2011-2015 at INAF Italy. From 2015 to 2018, he won an International Junior Research Fellowship and worked at ICC of Durham University. His main research interests are cosmology. He was a member of Euclid mission and the DESI project. In 2018, he jointed Nanjing University as an associate professor.

Abstract

Current tests of general relativity (GR) remain confined to the scale of stellar systems or the strong gravity regime. A departure from GR on cosmological scales has been advocated as an alternative to the cosmological constant to account for the observed cosmic expansion history. However, such models yield distinct values for the linear growth rate of density perturbations and consequently for the associated galaxy peculiar velocity field. Measurements of the resulting anisotropy of galaxy clustering have thus been proposed as a powerful probe of the validity of GR on cosmological scales, but despite substantial efforts, they suffer from systematic errors comparable to statistical uncertainties.



In this talk, I will present the results of a forward-modelling approach that fully exploits the sensitivity of the galaxy velocity field to modifications of GR. We use state-of-the-art highresolution N-body simulations of a standard GR (Λ cold dark matter (CDM)) model and a compelling f(R) model—one of GR's simplest variants, in which the Ricci scalar curvature, R, in the Einstein–Hilbert action is replaced by an arbitrary function of R—to build simulated catalogues of stellar-massselected galaxies through a robust match to the Sloan Digital Sky Survey. We find that f(R) fails to reproduce the observed redshift-space clustering on scales of ~1–10 Mpc h−1, where h is the dimensionless Hubble parameter. Instead, the standard ΛCDM GR model agrees impressively well with the data. This result provides strong confirmation, on cosmological scales, of the robustness of Einstein's general theory of relativity.

All are welcome ! Tea, coffee will be served at 2:15 PM.