KMI Colloquium

"3D Weak Lensing with Sizes and Shapes"



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Abstract:

The gravitational distortion of light from distant galaxy images is a tremendous resource for cosmology, with the potential to reveal valuable information on Dark Energy and Dark Matter, and to test the theory of gravity, being able in principle to detect the presence of extra dimensions. In order to exploit the physical effect of weak gravitational lensing, the analysis of image catalogues has to be very highly optimised, to extract as much information as possible on the subtle differences between models. In this talk, I will review the use of full 3D information in Cosmic Shear, and present latest results from the largest optical weak lensing survey, the CFHTLenS. Traditionally weak lensing concentrates on the changes in shape, but I will also explore the possibility of using the associated changes in size as a complement to shear, and show that size measurements can increase the Dark Energy Figure of Merit by about a factor of two, with no extra observing time. This is likely to be especially effective for space-based surveys, such as the planned ESA Euclid mission weak lensing imaging survey.

