"The New Era of Precision Cosmology: Testing Gravity at Large Scales"

Abstract: Cosmic acceleration may be the biggest phenomenological mystery in cosmology today. Various explanations for its cause have been proposed, including the cosmological constant, dark energy and modified gravities. Structure formation provides a strong test of any cosmic acceleration model because a successful dark energy model must not inhibit the development of observed large-scale structures. Traditional approaches to studies of structure formation in the presence of dark energy or a modified gravity implement the Press & Schechter formalism (PSF). However, does the PSF apply in all cosmologies? The search is on for a better understanding of universality in the PSF. In this talk, I explore the potential for universality and talk about what dark matter haloes may be able to tell us about cosmology. I will also discuss the implications of this and new cosmological experiments for better understanding our theory of gravity.