

## Tracing Dark Matter in the Universe

*Saturday, 30 April 2011 09:00 (45 minutes)*

Where is the Dark Matter located? How is it distributed on large scales? I will discuss recent observations using the Sloan Digital Sky Survey that utilize gravitational lensing to trace the mass distribution around galaxies and clusters of galaxies to the largest scales yet observed. We compare the mass distribution with the observed distribution of light and show that, while the mass distribution is considerably more extended than light on galactic scales-representing the huge dark-matter haloes around galaxies, the mass follows light on larger scales.

On scales larger than a few hundred Kpc, there is no significant separation between dark and luminous (baryonic) matter; the mass and light follow each other with a nearly constant mass-to-light ratio. This universal M/L value indicates the end of the dark-matter excess over light; it thus represents the total mass-density of the Universe. The results suggest that most of the dark matter in the Universe is located in very large haloes around galaxies and inside clusters of galaxies, but no significant increase in the dark-matter component is present on larger scales. The “end” of the dark-matter distribution is reached on these scales. The implications for cosmology and the mass-density of the Universe, as well as for galaxy and structure formation, will be discussed.

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