



SPEAKER: Dr. Chamkaur Ghag (University College London)

TITLE: **First results from the LUX Dark Matter Experiment**

DATE: Tue 19/11/2013 11:00

PLACE: Council Chamber

## ABSTRACT

Discovery of the nature of dark matter is internationally recognized as one of the greatest contemporary challenges in science, fundamental to our understanding of the Universe. The most compelling candidates for dark matter are Weakly Interacting Massive Particles (WIMPs) that arise naturally in several models of physics beyond the Standard Model. The discovery of galactic WIMPs would therefore enlighten two of the outstanding problems of modern physics - the matter composition of the Universe and the extrapolation of the Standard Model of particle physics to GUT scales. Although no definitive signal has yet been discovered, the worldwide race towards direct detection has been dramatically accelerated by the remarkable progress and evolution of liquid xenon (LXe) time projection chambers (TPCs). They have shifted the scale of target mass by orders of magnitude whilst simultaneously reducing backgrounds to unprecedented low levels, becoming the leaders of the field and offering the most promising prospects for a first definitive detection.

I will present on the current status in the worldwide hunt for WIMPs, where the LXe TPC based LUX experiment, operated in the Davis Cavern of the SURF laboratory, USA, has recently announced results from its first science run. From an exposure of 85 days, having found no evidence of signal above expected background, LUX has set constraints on scalar WIMP-nucleon interactions above  $7.6 \times 10^{-46} \text{ cm}^2$  at 33 GeV/c<sup>2</sup> WIMP mass (90% C.L.) - three times more sensitive than any competing experiment. This first result also seriously challenges the interpretation of hints of signal detected in other experiments as arising from low-mass WIMPs. Finally, I will report on the planned multi-tonne successor to LUX: the LZ experiment. This instrument will have sensitivity ideally matched to explore the bulk of the remaining theoretically favoured electroweak phase space for galactic Dark Matter discovery.

Organised by: M. Mangano, C. Lourenco, G. Unal.....  
\*\*Tea and Coffee will be served at 10h30\*\*