

# School of Physics and Astronomy

## HEP SEMINAR

### Simulations of the 3-D WIMP Velocity Distribution for Directional Dark Matter Detection Experiments



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Weakly Interacting Massive Particles (WIMPs) are one of the leading candidates for Galactic Dark Matter (DM). In the last three decades, a large number of experiments has been built and is being planned to search for different WIMP candidates by direct detection of scattering signals of ambient WIMPs off target nuclei in low-background underground laboratory detectors. Among these experiments, "directional" detection has been proposed to be a promising experimental strategy for discriminating WIMP signals from backgrounds by using 3-dimensional information (the recoil track and/or the head--tail sense) of WIMP-nucleus scattering events.

In this talk, I will first present our (Monte Carlo) simulation results of the angular distribution of the 3-dimensional WIMP velocity in different celestial and geographical coordinate systems. Besides the diurnal modulation of the angular distribution of the WIMP velocity, the so-called "directionality" of DM signals, a possible "annual" modulation will also be demonstrated. Finally, I will discuss our Bayesian reconstruction results of the (annual modulation of the) radial component of the WIMP velocity distribution. All laboratory-dependent simulations presented in this talk will be performed for the Australian SUPL underground laboratory.

Date:	Thursday 18 April
Time:	11am
Venue:	L1, Large Seminar Room, 10 College Walk, Clayton

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