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## **Samuel Witte (U. of Valencia): Unified Halo-Independent Formalism for Direct Detection Experiments**

*Thursday 22 February 2018 11:51 (14 minutes)*

In this talk I will present a new halo-independent formalism for the analysis of direct dark matter detection experiments which proves that: either the dark matter speed distribution or the Galactic dark matter velocity distribution that maximizes any likelihood can always be expressed in terms of a small number of delta functions. The aforementioned proof, based on the Fenchel-Eggleston theorem for convex hulls, generalizes previously developed halo-independent analyses that, until recently, required the existence of an extended likelihood (i.e. unbinned data) and could only be applied to measurements of the unmodulated rate. Depending on if the best-fit halo function is unique, this result either allows for the construction of two-sided pointwise halo-independent confidence bands or a degeneracy band. Finally, I will show that enforcing isotropy in the Galactic frame leads to an unmodulated best-fit halo function that is piecewise linear, differing significantly from the unconstrained best-fit halo function.

**Presenter:** WITTE, Samuel (IFIC, University of Valencia)

**Session Classification:** Session 7