Contribution ID: **13**   Type: **not specified**

Quantifying compatibility among WIMP direct search data in a halo-independent way

Tuesday, 9 August 2016 16:30 (20 minutes)

We propose a novel halo-independent way of reporting the level of compatibility among WIMP direct search data sets. The main ingredient of the method is 'plausibility region', where any halo-function that can bring a certain level of compatibility should be fully contained in. The construction of the region is based on a new test statistic called "constrained parameter goodness-of-fit", which is a modification of parameter goodness-of-fit designed to gauge mutual compatibility among data sets. The method can be used to further exclude the region inside the pointwise confidence band constructed from a global likelihood. As a demonstration, we apply the method to CDMS-II-Si and SuperCDMS data for WIMPs with elastic or exothermic inelastic SI interactions.

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Session Classification: Afternoon Session