Contribution ID: **108** Type: **Oral**

Laying the groundwork for trust in dark matter results

Wednesday, May 15, 2024 5:35 PM (25 minutes)

As new dark matter detectors turn on, it's useful to think about what dark matter discovery will look like.

This talk will discuss two aspects of building trust in dark matter results: (1) data blinding through adding "salt,"or fake signal, and (2) the possibilities in combining underground detector information to further constrain backgrounds.

Several dark matter experiments (this talk will focus on CDMS and LUX) have used salt in their analyses. For CDMS, creating salt was time-consuming enough that salting is not currently a viable blinding method for first results. If we could generate salt more quickly, this would be a great blinding method for first results as it allows analyzers to look at the entire data set! I will discuss our efforts at using Generative Adversarial Networks, a type of deep machine learning, to quickly generate salt. Our software library is open source and will soon be publicly available on pypi.

I will also discuss the current state of a collaboration between SuperCDMS and the National Science Data Fabric, an NSF-funded organization that specializes in helping scientists do more science through easier data access. Together with a project aimed at making custom binary data more accessible without requiring changing format, PONDD, it's possible to imagine combining data across underground detectors, which could create a wide veto array and potentially further constrain environmental radiation.

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Session Classification: Advanced Data Analysis

Track Classification: Advanced Data Analysis