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Improving the LUX PLR Code

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LUX uses the hypothesis testing based on a profile likelihood ratio to determine the consistency of its data to a background only hypothesis, as well as to set confidence limits on the interaction strength of potential dark matter candidates.

In this talk I will present on improvements made to the code base used for conduction these tests. The model generation is now streamlined based on configuration files generated by a newly developed python tool. This allows analysis specific changes to be easily implemented without a substantial re-write of the model generation code. Things that can now be easily altered include: combining multiple runs of the experiment, altering which observables are used (eliminating the spatial variables, or including a machine learning WIMP-score, for instance), the energy range of the analysis, or which backgrounds are included. Additionally, we have introduced additional hypothesis test inversion methods custom built for simplicity and efficiency.

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