

Likelihood Methods in the CRESST-Experiment

Wednesday, 1 September 2021 19:15 (15)

Despite overwhelming astrophysical evidence for the existence of Dark Matter and intense efforts towards its detection, no clear signal has been found so far. Nonetheless, monumental advancements have been made in the field which allowed to put significant constraints on the parameter space for possible particle candidates. For this reason, various statistical methods have been employed and developed. For many direct dark matter searches the optimal interval method, an extension of the maximum gap method developed by Yellin, has been the golden standard. Recently however, many experiments have shifted to maximum likelihood based methods for their statistical data analysis.

CRESST is a direct Dark Matter search experiment utilizing scintillating cryogenic bolometers as detectors. This detector principle allows for an extremely low detection threshold as well as particle discrimination. These features allowed CRESST to be one of the leading experiments in low-mass Dark Matter searches for many years.

In this contribution an application of the maximum likelihood formalism to the data of CRESST detectors is presented. Recent improvements in detector performance and better understanding of the detector behavior have made the use of a complete and un-binned likelihood approach both possible and beneficial. This method enables a better understanding of the properties of individual detectors as well as the use of profile likelihood for limit calculations.

Reference to paper (DOI or arXiv)

Your gender (free text)

Primary author(s) : SCHMIEDMAYER, Daniel (TU-Wien & HEPHY Vienna)

Co-author(s) : REINDL, Florian (HEPHY (ÖAW) & TU Wien, Vienna)

Presenter(s) : SCHMIEDMAYER, Daniel (TU-Wien & HEPHY Vienna)

Session Classification : Poster session 2

Track Classification : Dark Matter and its detection