Contribution ID: **24** Type: **not specified**

Detecting new signals under background mismodelling

Thursday, 1 August 2019 11:00 (30 minutes)

When searching for new astrophysical phenomena, uncertainty arising from background mismodelling can dramatically compromise the sensitivity of the experiment under study. Specifically, overestimating the background distribution in the signal region increases the chances of missing new physics. Conversely, underestimating the background outside the signal region leads to an artificially enhanced sensitivity and a higher likelihood of claiming false discoveries. The aim of this work is to provide a unified statistical algorithm to perform modelling, estimation, inference and signal characterization under background mismodelling. The method proposed allows to incorporate the (partial) scientific knowledge available on the background distribution, and provides a data-updated version of it in a purely nonparametric fashion, without requiring the specification of prior distributions. If a calibration sample or control regions are available, the solution discussed does not require the specification of a model for the signal; however, if the signal distribution is known, it allows to further improve the accuracy of the analysis and to detect additional signals of unexpected new sources.

Primary author: Dr ALGERI, Sara (University of Minnesota)

Presenter: Dr ALGERI, Sara (University of Minnesota)

Session Classification: General