

Gamma rays and multiwavelength astronomy with 3ML

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In the last decade, the number of known gamma-ray sources has exploded and gamma-ray astronomy is reaching an era of precision measurements. Wide-field-of-view observatories like Fermi-LAT in the GeV range and HAWC in the TeV range, as well as IACTs like H.E.S.S., MAGIC, and VERITAS, have amassed a wealth of data. Some of these experiments have made data and analysis tools available to the public. To unlock the full potential of these data, we need to be able to combine them not just with data from other gamma-ray instruments, but also with data from other wavelengths. There are several current efforts to this end. In this presentation, I will focus on threeML, the multi-mission maximum likelihood framework. Its flexible, plugin-based structure enables the inclusion of data from many different observatories in their diverse native formats. ThreeML relies on astromodels, a flexible modeling framework, for the description of astronomical sources. Source modeling and data access are thus separate from likelihood optimization, and can be combined in a flexible manner. In addition to the (frequentist) maximum likelihood analysis, threeML also allows for Bayesian analysis via sampling of the posterior distribution. I will report on the current status of threeML and astromodels, and show some examples for joint likelihood fits using threeML.

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