Characterizing γ-ray sources with HAL (HAWC Accelerated likelihood) and 3ML

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Executive Summary: The open-source Multi-Mission Maximum likelihood (3ML) Framework allows for the common analysis of diverse datasets. The ability to consistently fit and characterize astronomical data across many decades in energy is key to understanding the origin of the emission we measure with many different instruments. 3ML uses plugins to encapsulate the interfaces to data and instrument response functions. The user can then define a model with one or multiple sources to describe a given region of interest. The model is fit to the data to determine the locations, spatial shapes, and energy spectra of the sources in the model. The High Altitude Water Cherenkov (HAWC) Observatory, a wide FoV instrument sensitive to energies from 300 GeV to above 100 TeV, has used 3ML for data analysis for several years using a plugin optimized for single source analysis. As multisource fitting became more common, a faster plugin was required. Spectral fits to the Crab Nebula and the nearby source HAWC J0543+233 obtained using HAL, the HAWC plugin for 3ML, will be presented, along with a comparison to the published values.