

8th Heidelberg International Symposium on High-Energy Gamma-Ray Astronomy

Contribution ID: **108** Contribution code: **INSTR/SW**

Type: **Poster**

GammaBayes

Wednesday 4 September 2024 08:40 (1 minute)

This presentation introduces GammaBayes, <https://github.com/lpin0002/GammaBayes>, a Bayesian Python package designed for dark matter detection using the Cherenkov Telescope Array Observatory (CTAO). GammaBayes processes CTAO gamma-ray measurements alongside user-defined dark matter particle models, providing the posterior distribution for dark matter parameters such as the dark matter mass and its velocity-averaged annihilation cross-section. Additionally, it calculates Bayesian evidence for model selection.

This talk showcases GammaBayes with 525 hours of simulated data, capturing 10^8 gamma-rays, 10^5 of which originate from the self-annihilation of a 1 TeV mass dark matter particle. The no-signal hypothesis is excluded with nearly 5 sigma credibility. Exclusion limits for the dark matter mass vs. annihilation cross-section are derived as well. We will also discuss potential extensions of GammaBayes to incorporate advanced signal and background models, alongside the computational challenges that accompany these enhancements.

Primary authors: BALAZS, Csaba (Monash University); Prof. THRANE, Eric (Monash University); Mr PINCHBECK, Liam (Monash University)

Presenter: BALAZS, Csaba (Monash University)

Session Classification: Poster hang