Contribution ID : **367** Type : **Poster**

# Bayesian Superiority in On/Off analysis

*Friday, 30 October 2026 16:55 (5)*

We present a detailed comparison of Bayesian criteria with three non-informative priors - flat, Jeffreys, and scale-invariant - for testing a signal against an unknown background and compare them with the classical frequentist Li-Ma approach in the On/Off problem. We perform Monte Carlo simulations for various background levels and evaluate the Li-Ma and Bayesian criteria by their Type I error rates. We then simulate a nonzero signal and compare the criteria in terms of Type II error rates. We find that both the Li-Ma criterion and the Bayesian criterion with the Jeffreys prior control Type I error well, excluding the case of small background b<0.5; the Bayesian criterion with the Jeffreys prior is statistically more powerful than the Li-Ma criterion for b⊠40. (based on preprint 2609.11683 [astro-ph.IM])

**Primary author(s) :** Dr. SATUNIN, Petr (INR RAS); Mr. BABENOV, Gleb (YANDEX (ex- Moscow State Univercity))

**Presenter(s) :** Dr. SATUNIN, Petr (INR RAS)

**Session Classification :** Poster session

**Track Classification :** Artificial Intelligence in particle physics and astrophysics