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**Bayesian Gaussian Process Models for Effective Field Theory Truncation Errors**[1] JORDAN MELENDEZ, DICK FURNSTAHL, Ohio State Univ - Columbus, DANIEL PHILLIPS, Ohio University, MATTHEW PRATOLA, Ohio State Univ - Columbus, SARAH WESOLOWSKI, Salisbury University — Effective field theories (EFTs) have truncation errors which are continuous functions of kinematic variables. This work extends a point-wise analysis of truncation errors in an EFT of nucleon-nucleon scattering to a curve-wise analysis via Gaussian processes that account for correlations in the truncation errors in both angle and energy. The Gaussian process is a Bayesian model of random curves, and this talk will explain how to construct and test such a model from scratch, including the incorporation of physics knowledge into hierarchical models, the application of priors, and model validation techniques explored via toy data. The use of modern statistics packages make it easy to code and visualize models that can be efficiently sampled with the No-U-Turn Sampler (NUTS). We show that statistical analyses using Gaussian processes can be a powerful tool for validating or questioning the construction of effective field theories.

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