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## Model Building with Non-Parametric and Parametric Components for Partial Wave Analysis

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NIFTy[1], a probabilistic programming framework developed for astrophysics, has recently been adapted to be used in partial wave analyses (PWA) at the COMPASS [2] experiment located in CERN. A non-parametric model, described as a correlated field, is used to characterize kinematically-smooth complex-binned amplitudes. Parametric models, like a Breit-Wigner distribution, can also be mixed in. This method is being investigated for use in the GlueX experiment located in Jefferson Lab.

I will introduce `iftpwa`[3], a flexible model-building framework that can construct and interfere both parametric and non-parametric amplitudes. A single configuration file is used to build a model and describe the optimization procedure resulting in a variationally approximated posterior distribution. This framework is designed to be modular which provides an avenue for inter-collaboration use and development.

### References

- [1] G. Edenhofer, P. Frank, J. Roth, R. H. Leike, M. Guerdi, L. I. Scheel-Platz, M. Guardiani, V. Eberle, M. Westerkamp, and T. A. Enßlin. Re-Envisioning Numerical Information Field Theory (NIFTy.re): A Library for Gaussian Processes and Variational Inference, 2024.
- [2] F. M. Kaspar, J. Beckers, and J. Knollmüller. Progress in the Partial-Wave Analysis Methods at COMPASS. EPJ Web Conf., 291:02014, 2024.
- [3] F. M. Kaspar and L. Ng. `iftpwa`, 2024. Github Repository.

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