

Seminar

Bayesian framework for model-data comparison incorporating theoretical uncertainties

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Accurate comparisons between theoretical models and experimental data are critical for scientific progress. However, inferred physical parameters can vary significantly with the chosen physics model, highlighting the importance of properly accounting for theoretical uncertainties. In this work, we explicitly incorporate these uncertainties using Gaussian processes that model the domain of validity of theoretical models, integrating prior knowledge about where a theory applies and where it does not. We demonstrate the effectiveness of this approach using two systems: a simple ball drop experiment and multi-stage heavy-ion simulations. In both cases incorporating model discrepancy leads to improved parameter estimates, with systematic improvements observed as additional experimental observables are integrated (arXiv: 2504.13144).

Friday, May 23rd 2025

16:00 Hrs (Tea / Coffee 15:45 Hrs)

Auditorium, TIFRH