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Gallifray: A Geometric Modelling and Parameter Estimation Framework for Black hole images using Bayesian Techniques

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Recent observations from the EHT of the center of the M87 galaxy have opened up a whole new era for testing general relativity using BH (Black hole) images generated from VLBI. While different theories have their version of BH solutions, there are some 'geometric models' as well which can be approximated to visualize the image of a BH in addition to understand the geometric properties of the radio source such that ring size, width, etc. To incorporate and implement such a framework, different methods and techniques are needed to be explored for doing such model comparison. We present 'Gallifray'[1], an open-source Python-based framework for geometric modeling and estimation/extraction of parameters. We employ Bayesian techniques for the analysis and extraction of parameters. In my presentation, I will talk about the workflow, preliminary results obtained, and applications of the library for image/model comparison. I will also talk about the scope of the library in testing Black hole images for any possible deviation from Kerr spacetime.

References:
[1] https://github.com/Relativist1/Gallifray/

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