

Traditional EMRI waveform modelling

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Goals

- What talks we saw:
 - Adam: Overview of EMRI waveform models;
 - Christian: Rapid generation strategies;
 - Gabriel: Spinning secondaries effects.
- Future discussions:
 - Josh: Adapting models for data analysis;
 - Andrea: Modelling and measuring beyond-vacuum-GR effect;
 - Nicolas: Testing GR with EMRIs
 - ...

DDPC timeline

Dataset	Date dataset created	Date WF models needed	Model
CD1-Light “Mojito-Light”	17th December 2025	June 2025	• 0PA Kerr Eccentric Equatorial
CD1-Heavy “Mojito-Heavy”	June 2027	December 2026	• 1PA Schwarzschild Circular
CD2 “Long Island Iced Tea”	Q1 2028	Q2 2027	• 0PA precessing (spherical) • 0PA precessing, eccentric (generic) - bad • Spinning secondary Equatorial or Precessing • 1PA Hybrid (WaSABI-C/E) • IMR Schwarzschild • Extensions (beyond vacuum GR)
CD3 “Aunt Roberta”	Q3 2030	Q1 2030	• Resonances • 0PA precessing, eccentric (generic) - good • High eccentricity (phase space) • IMR Kerr

- Which are the main priorities for EMRI waveform modelling?

Challenges

- 0PA fluxes
 - Extent of parameter space
 - Accuracy for edge cases
- 1PA: cons. 1SF and diss. 2SF
 - What can be covered by numerical data?
 - Hybrid models
- 1PA: secondary spin
 - Which spin gauge should we use?
 - Corrections to amplitudes
- 2PA?
- Resonances
- Covering the parameter space
 - Can astrophysics/systematics tell us the boundaries?
- Beyond GR/environment modelling (next sessions):
 - LISA Consortium Key project ..
 - Do we need 1PA models? ..
- Selecting and summing the amplitudes in FEW
 - Mode summation/torus method
 - Ultrafast waveforms ($< 1 \mu\text{s}$)
- ...