

Title: Discussion: Alternative Theories

Speakers:

Collection: The 24th Capra meeting on Radiation Reaction in General Relativity

Date: June 08, 2021 - 1:15 PM

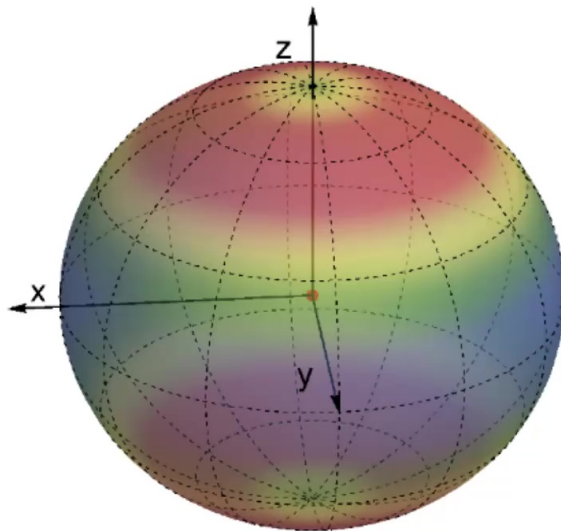
URL: <http://pirsa.org/21060034>

~~Alternative theories~~ - ~~Theories beyond GR~~ - discussion session

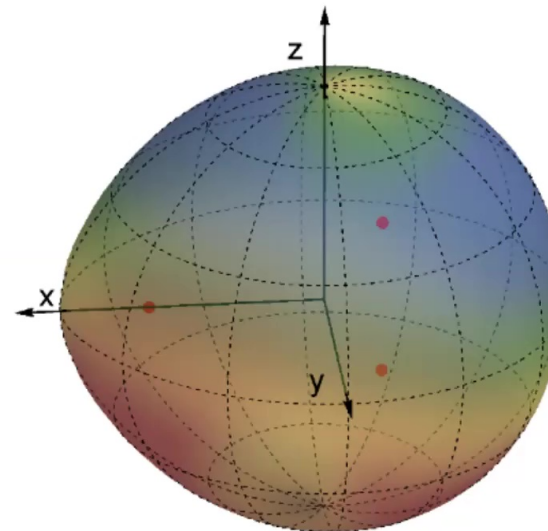
1. **Beyond GR vs complex geodesics (eccentricity, non-equatorial):**
 - a. dephasing/mismatch not enough: how much real parameter estimation deteriorates the constraints?
 - b. Overall: how accurate shall beyond-GR EMRI waveforms be (wrt GR waveforms)?
2. **Model-agnostic smoking guns:** (which one more promising? Depends on the theory/model)
 - a. Dipolar radiation / other dissipative channels
 - b. Resonances / Chaos
 - c. Multipolar structure of the primary can be much more complex than Kerr!
3. **Self-force beyond GR**
 - a. Worth it for EMRIs? (see point 1 above)
 - b. Useful to build more accurate MBHB/IMRI templates beyond GR?
4. **Multipolar structure of the secondary:**
 - a. potentially interesting (e.g. Kerr bound) but is it measurable or even relevant?
5. **What if something anomalous is detected?** *Is Einstein wrong? Environment? Waveform Systematics?*
6. **Bounds:**
 - a. EMRIs: LISA will fly in ~15 yr → compare future bounds with LIGO/Virgo at design sensitivity

$$M_\ell^{\text{Kerr}} + iS_\ell^{\text{Kerr}} = M^{\ell+1} (i\chi)^\ell$$

Kerr



Fuzzball



Credits: G. Raposo

NO equatorial symmetry → e.g. $S_2 \neq 0$, $M_3 \neq 0$
 NO axial symmetry → e.g. $M_{20} \neq 0$, $M_{21} \neq 0$, $M_{22} \neq 0$

Alternative theories #2

1. Ryan's approach (mapping BH spacetime) beyond GR
- 2.



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