Capra round-up: Then and now

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Historical reflection

- Reluctant to join Capra community
  - “self-force not well posed” - not gauge invariant
  - De Witt’s circuitous/wrong arguments didn’t help at all
- My first Capra, in 2001, was an accident
  - Visiting Golm for completely unrelated reasons
  - Only missed one Capra (2014) since
- My first “Where are we going now?” was in Kyoto, 2003
- I was/am lucky - colleagues have already described our recent work

Progress!

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Capra 2003 issues

- Still no gauge invariant results - cf 2015!

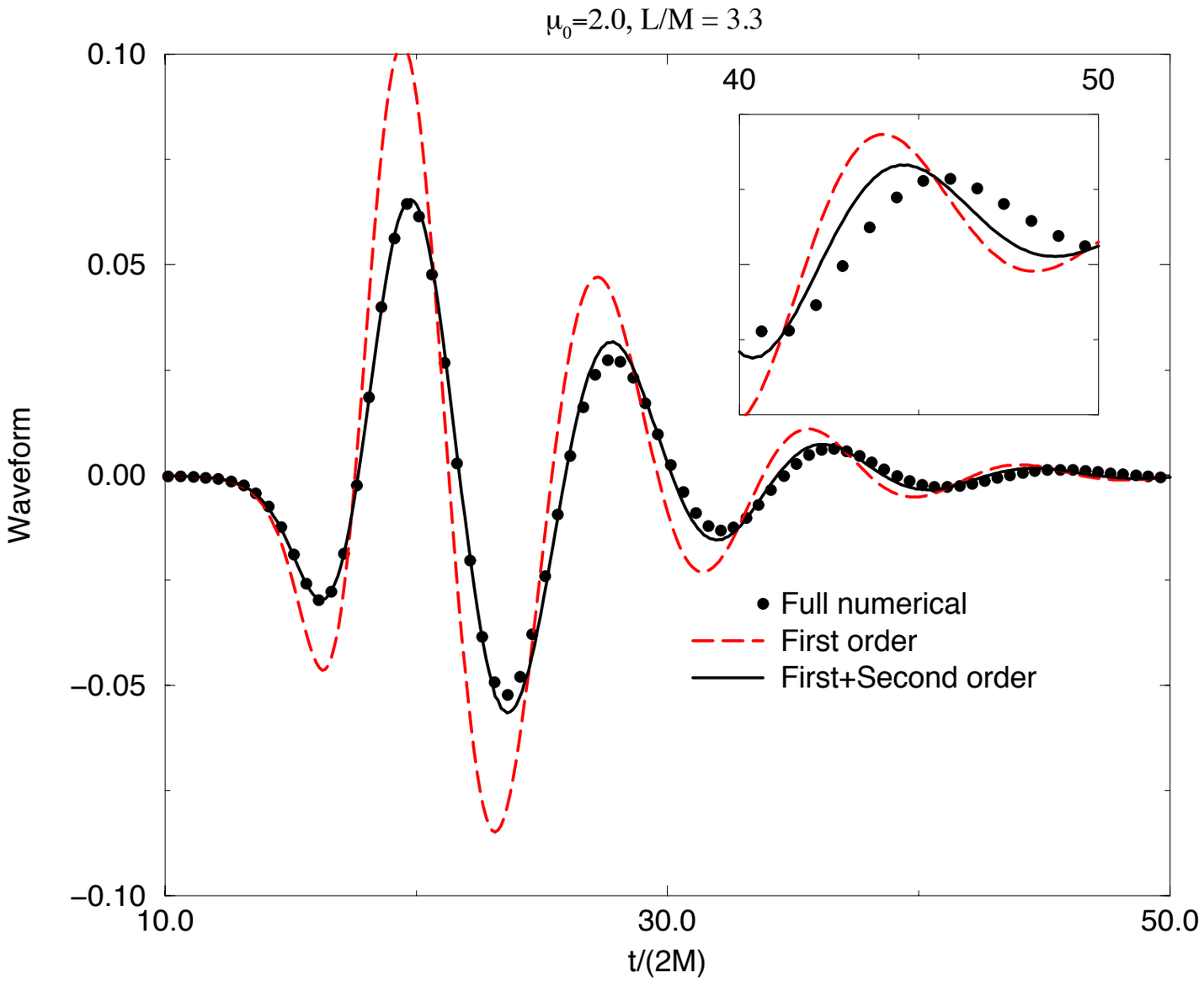
- Still no $\ell = 0,\ 1$ results for Kerr (compatible with mode decomposition) - not a real issue; use Wald for δM and δJ and work in a different gauge.

- Still no metric reconstruction with sources in Kerr - without sources solved by Ori, and Friedman et al

- Like better understanding of R and S fields - this has evolved, cf Poisson's LRR; now no longer an issue

Capra 2015 issues?

- Comparison with numerical data (2) - what a surprise?
  - SF puncture not so simple after all in NR (1) #
- Second order (5) # - still not there
  - calculational formalism (2)?
  - calculational problem (2) #
  - Infra-red divergence (1)!
- Eccentric orbits (6)!; and Kerr background (4)?
- Do we have enough new/young people?



From: "Second order gravitational perturbations of a Kerr black hole"

Manuella Campanelli
Capra 2002, Penn. State

Capra 2015 highlights

- Kyoto is not so hot and humid as sometimes
- So many gauge invariant quantities (2+)
- Precision, SF-PN comparison, exact expansions (3)
- Eccentric orbits (6); and Kerr background (4)
- Innovation (4+), collaboration (10), interaction (++)
- Full second order electromagnetism toy model (1)
- Smaller than some Capra meetings, cafeteria lunches

Challenges for 2016

- Second order must top the list
  - how will we certify it? Need more than one result
- Comparison with numerical relativity
- When can/do we gear up for waveforms?
  - This was a concern even in Kyoto, 2003
  - Two-timing is one possible way; are we ready?
- Will Effective Field Theory be of any further use?
- Longevity of youth; maintain fraction of “new” contributors each year