Software to search for inspiralling compact binaries

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LSC@LHO, 15-17 August 00

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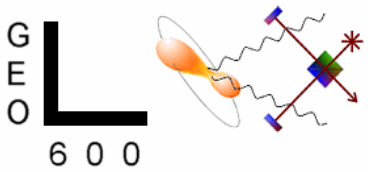

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Milestones for inspiral search

General comments

- Initially, LAL standard was intimidating but I think it has turned out to be a useful standard, very helpful in debugging
- Documentation presently available as individual LaTeXfiles
- Coming months, as we integrate UWM and Cardiff codes, should be painstaking as well as exciting
- Generation of frequency-domain waveforms cost roughly 1/2 of filtering costs
- Algorithm to speed up template generation

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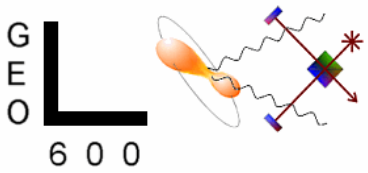

Milestones for inspiral search

Jan-Mar

1. Time-domain 2.5 PN T-approximant templates for point-masses. (no eccentricity and no spin)
   COMPLETED.

2. Frequency-domain T-approximants and time- and frequency-domain P-approximant templates for point-masses, all up to 2.5 PN order. (no eccentricity or spin)
   READY FOR SUBMISSION

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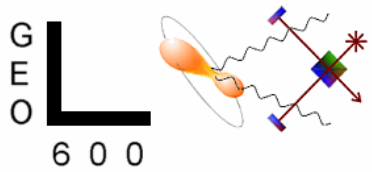

Milestones for inspiral search
Apr-Jun

3. Time-domain T-approximant templates with eccentricity. (up to whatever order waveforms are computed by then)
   READY FOR SUBMISSION

4. Template placement for point-mass, spin-less binaries
   BEHIND SCHEDULE BY A MONTH, ANOTHER 2 WEEKS

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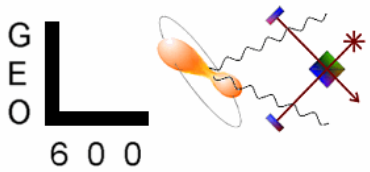

Milestones for inspiral search
Jul-Sep

5. Time-domain T-approximant templates for spinning binaries. (up to whatever order waveforms are computed by then)

6. 3.5 PN T- and P-approximants for point-masses. (This is only a days's job and can be done whenever the waveforms are available)

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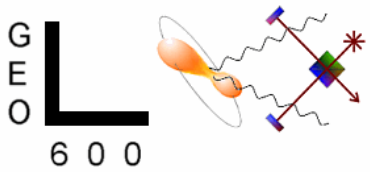

Milestones for inspiral search
Oct-May

7. Interpolation method
8. Template placement for multi-dimensional space including eccentricity
9. Template placement for multi-dimensional space including spins
10. Waveforms and template placement for multi-dimensional space including eccentricity and spins

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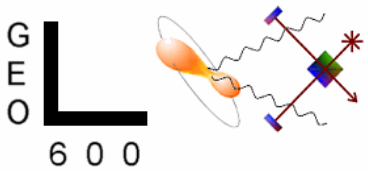

Template Generation – Demonstration

User needs to fill up the structure InspiralTemplate and call

InspiralWave (`Status` status, `REAL8Vector` *signal, `InspiralTemplate` params)

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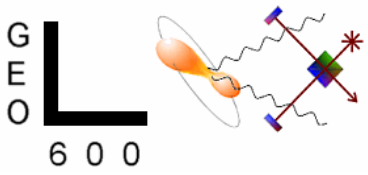

Template Generation – InspiralTemplate Structure

params.ieta = 1;
params.mass1 = 1.40;
params.mass2 = 1.40;
params.startTime = -1.e-8;
params.startPhase = 0.0;
params.fLower = 40.0;
params.fCutoff = 1000000.0;
params.tSampling = 4000.0
params.signalAmplitude = 1.0;
params.nStartPad = 0
params.nEndPad = 0;
params.method = one [two,three];
params.order = twoPointFivePN [newtonian,oneHalfPN,onePN,twoPN];
params.domain = TimeDomain [FrequencyDomain];
params.approximant = pade [taylor];
params.massChoice = m1Andm2 [totalMassAndEta,totalMassAndMu,t01,t02,t03,t04]

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