Post-merger optimized configurations for CE

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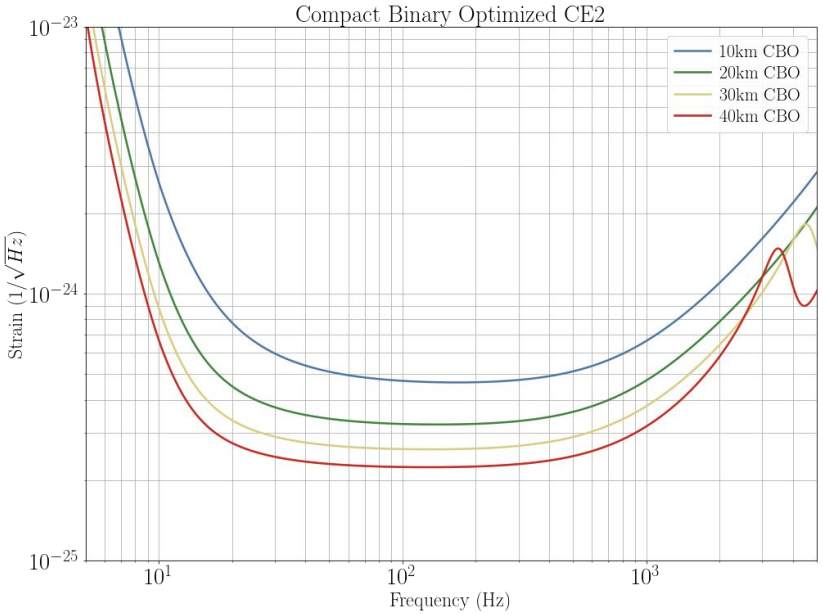
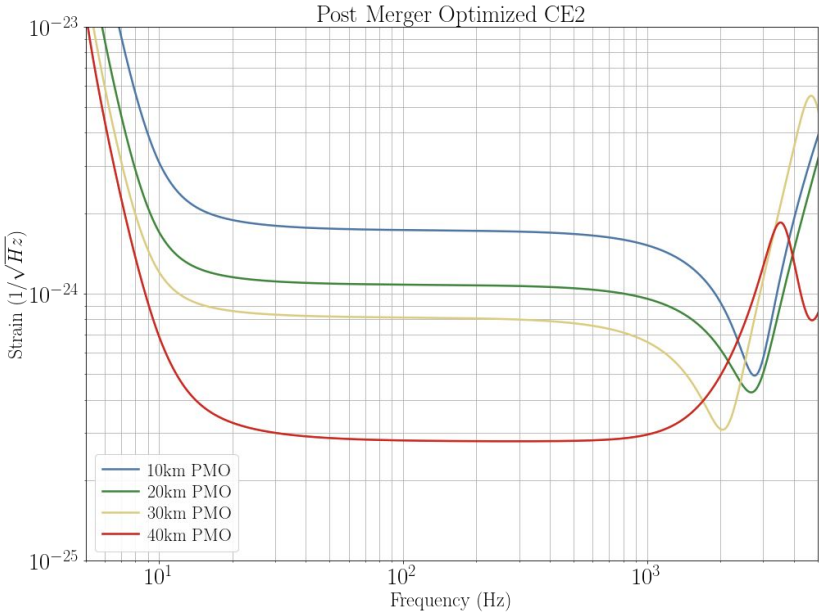
Post-Merger vs Compact Binary Optimized:

Optimal arm-length to study post-merger oscillations ~ 20km D Martynov et al., Phys. Rev. D 99, 102004 (2019)

Post-Merger vs Compact Binary Optimized:





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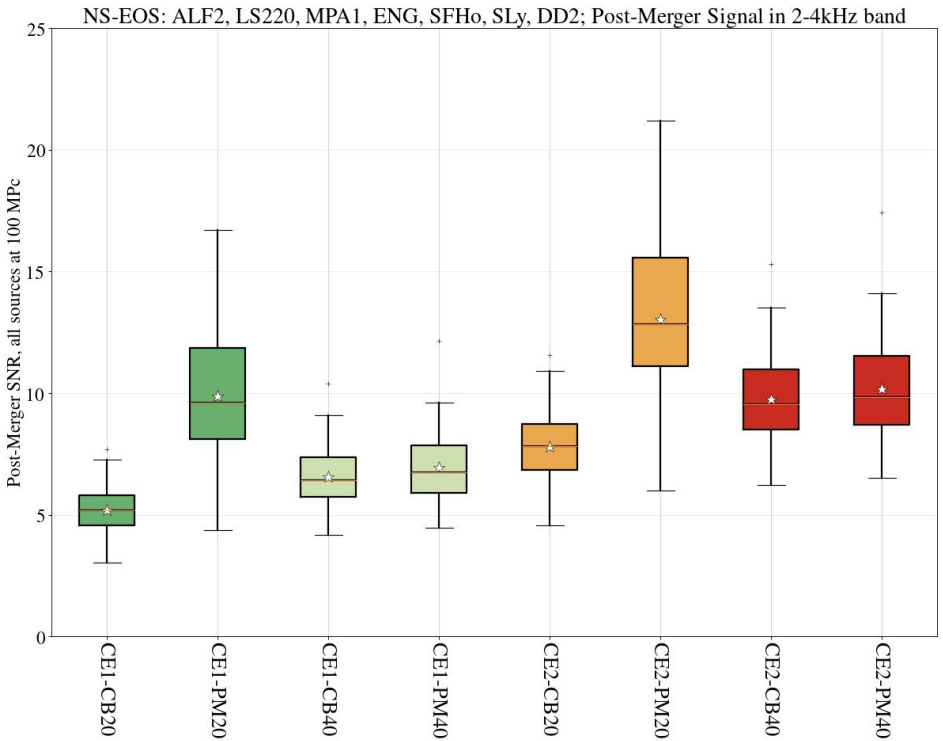
The CE design will offer the flexibility to switch between the post-merger optimized to compact-binary optimized sensitivities and vice-versa.

Post-Merger vs Compact Binary Optimized



The advantage of this tuning is:

1. Depending on the NS-EOS and the arm lengths of CE, this translates to an average improvement between 10%-150% in the post-merger SNR.

Considering the NR waveforms for post-merger ringdown from the CoRe database.

**more work in progress.

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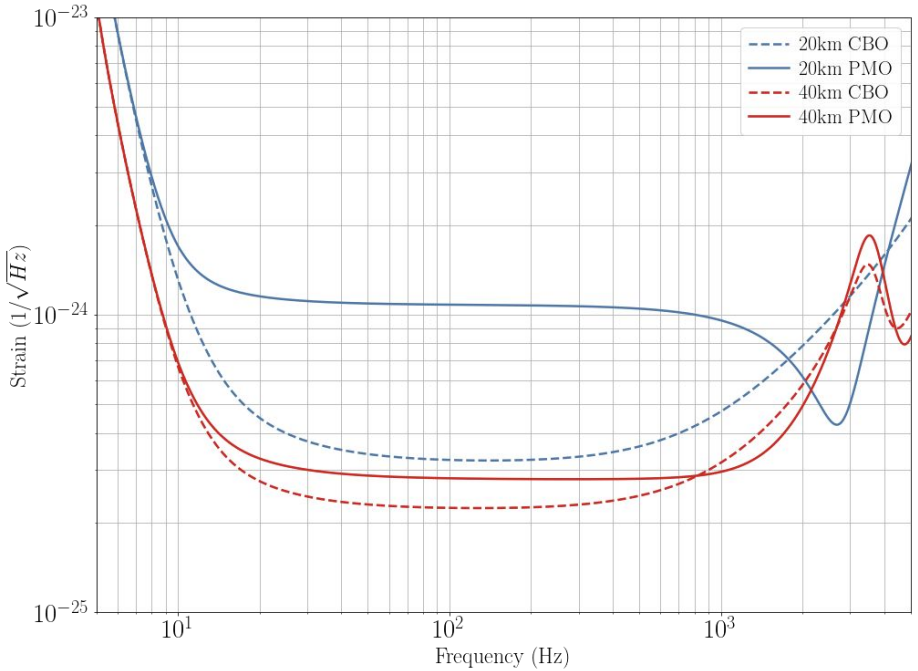

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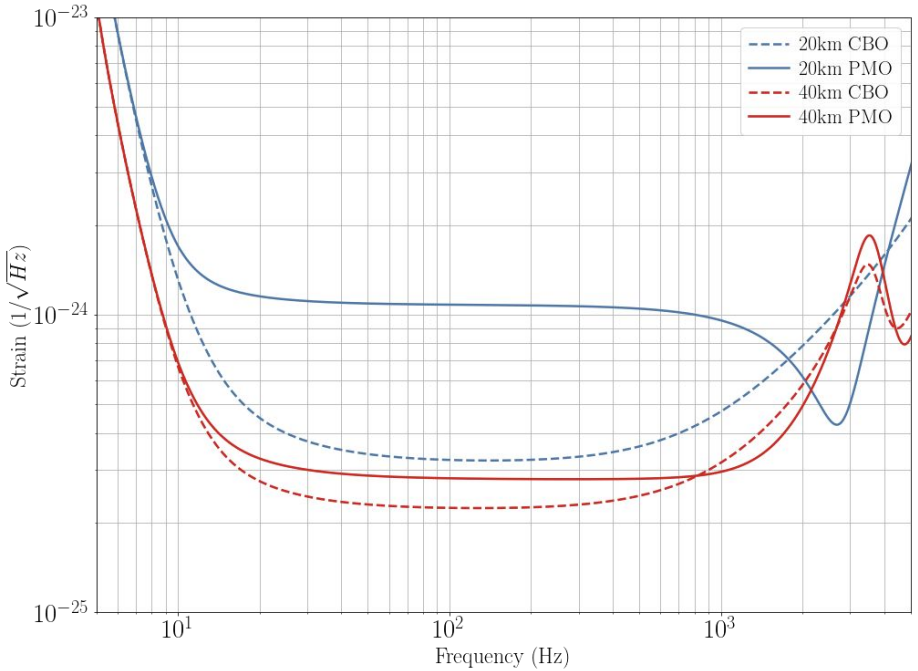

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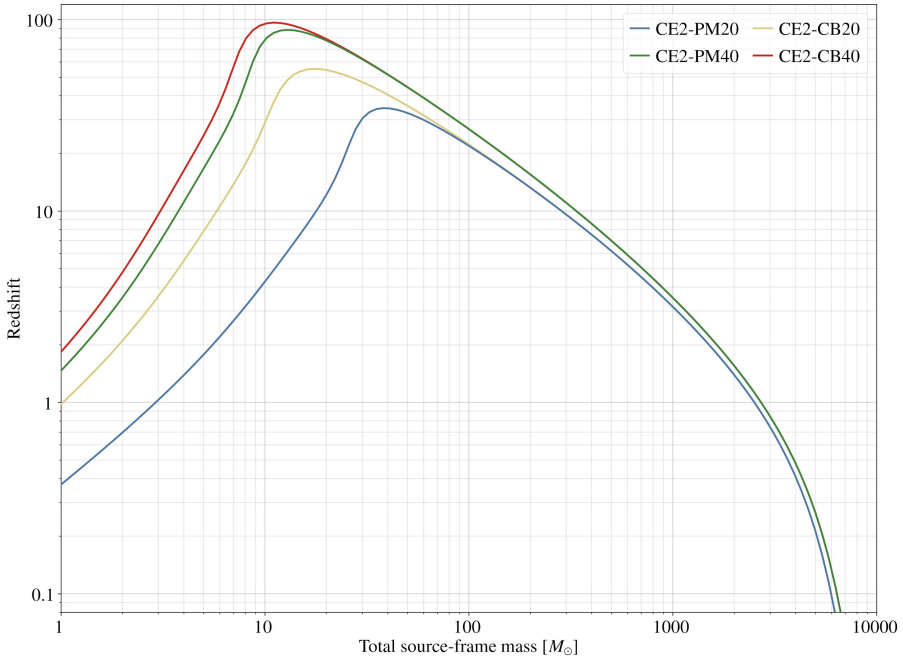
2. The bandwidth of high-frequency bin can be tuned based on the knowledge about the NS-EOS by the 2030s or later.
3. As the goals for cold-EOS are met one can switch to post-merger CE design?

Post-Merger vs Compact Binary Optimized

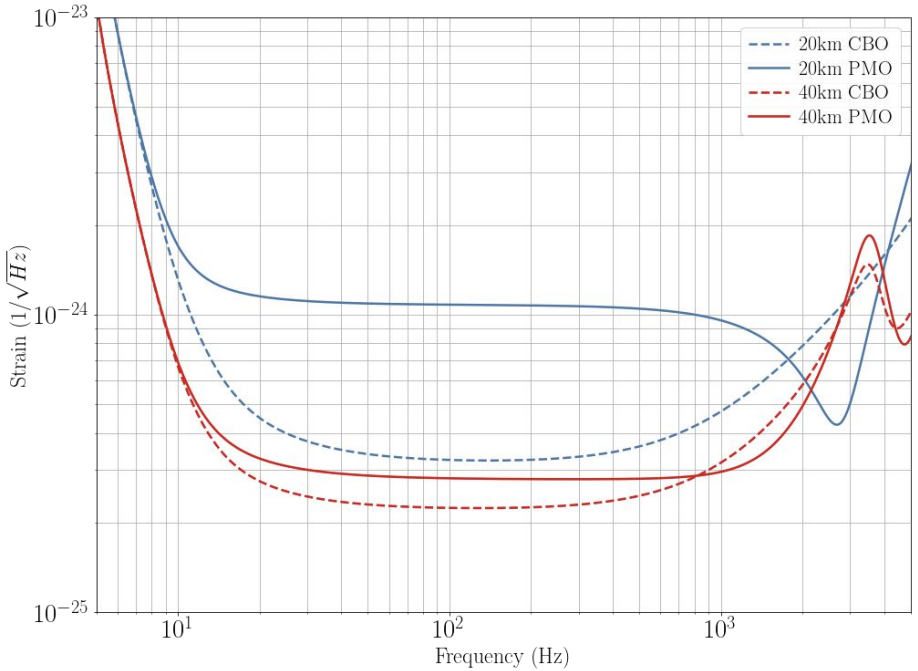


	Inspiral Range		Post-merger SNR; 100 MPc	
Arm Length (kms)	CBO (Gpc)	PMO (Gpc)	CBO	PMO
20	2.75	1.40	7.81	12.85
40	3.70	3.37	9.55	9.82

The disadvantage of this tuning is the loss in sensitivity at low frequency significantly affecting the horizon.

Inspiral range high but cosmological reach sabotaged.

Questions for Discussion



1. How significant is the post-merger signal alone to justify the switch from compact-binary optimized to post-merger optimized sensitivity?
2. Is the trade-off at low frequencies and cold-EOS reasonably justified?
3. What is the significance of joint observations of the EM counterpart and the post-merger oscillations on the understanding extreme matter?

Post-Merger vs Compact Binary Optimized: Backup