

# Close out discussion

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# What does this mean for the CE science driven design?

- **CE40, ET, LIGO-India** (Network #1)
- **CE40, ET** (Network #2)
- **CE40, CE20, LIGO-India** (Network #3)
- **CE40, CE20** (Network #4)

Collin Capano: should we stop using 40Km+40Km for simulations and papers?

Vicky Kalogera: No, we will want to keep exploring science that can be done in the best case scenario, scientifically. Also the landscape might change in the next few years.

# From Pedro Marronetti's slides

## What are the steps for Cosmic Explorer? (Dawn V 2019)

Horizon planning (3G Design NSF award in 2018) Cosmic Explorer White Paper (3G Design award product)	3 years (2021)	CEHS (2021)
Community endorses the WP (through Dawn meeting?)	½ year (2021)	Dawn VI (2021)
NRC report based on CE WP and GWIC reports	1 ½ years? (2023)	Bypassed
MPSAC subcommittee reviews NRC report Physics Division develops a written plan for MPS approval NSF Director decides to authorize CD funding	½ year (2024)	ngGW (2024) In the works In the works
Conceptual Design period	2-3 years (2027)	Support started in 2023 (\$8M)
Preliminary Design period award	2-3 years (2030)	
NSF approves submission to NSB	½ year (2030)	
Final Design period NSB prioritization OMB/Congress budget negotiations	2-3 years (2032)	
Congress appropriates MREFC funding (2032-37)	<b>14 years (2032)</b>	

# From Pedro Marronetti's slides

## Future

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- GW Detector construction will transition from a MREFC level (2G) to a supra-MREFC level (3G), similar to those of the largest scientific installations in the world (CERN, Fermilab, etc.)
- What worked for LIGO/Virgo in the past may be inadequate for projects like Einstein Telescope/Cosmic Explorer. More human resources need to be dedicated to the social/collaborative/organizational/political efforts
- The scientific and political paths ahead are not clear and they will possibly not be for a while
  - A management organization (awardee) must be identified
  - R&D and design concepts might need to be developed and re-developed
  - International collaborations must be formalized
  - Scientists and funding agencies need to work on a viable plan to support the construction and, also critically important, the operations of these installations

# Action items following the instrument discussion

- **Optical design:** we move ahead with two corner layouts, several suggestions for additional studies; need to identify areas that requires dedicated experimental effort in addition to ongoing efforts (if any)
- **Coatings:** we will write down a “coating manifesto” for CE incorporating the many insights that were brought to the table yesterday. Very much interconnected with path forward for A#
- **Facility compatibility with cryogenics:** several requirements to make the CE facility compatible with cryogenics identified, they need to be written down and additional calculations need to be done
- **R&D for CE and connection with A#:** first draft of a table that goes in some of the details of the needed research; need to add prioritization
- **What else?**

# Action items following the observational science discussion

- **Science relevant for DOE:** we need to identify compelling science goals that can increase our impact on DOE
- **What's lost with only 2 next-gen detectors:** we need to keep identifying (better if in peer reviewed papers!) what science is lost without CE 20 km. As Vicky said, things can evolve and we must have answers ready if that happens
- **What else?**

Thank you all!

This has been very informative and useful for Cosmic Explorer progress!

Many thanks to the SOC, LOC, and all participants.