

What comes Next for LIGO Workshop

**Panel on Gravitational Wave Science in
the Broader Context of US Science**

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May 8, 2015

How to promote GW Science in the US science policy and funding communities

- **What is the message and how to get it across?**
- The message--- Every time a new window has opened on the universe--- Galileo/optical telescope; radio astronomy; x-ray astronomy, etc.--- our understanding of the universe and what is out there has changed in revolutionary ways.
- There is an immerging new science-- -gravitational wave astronomy that has the potential to change our picture of the universe. This field will open within the next 5-10 years and will provide great opportunities for new knowledge, new opportunities to engage the public in science and to promote science education.

- The US has and will, through LIGO and partner astronomical and GW facilities, play a leading role in this new field.
- The US science policy and funding communities must take steps to assure the viability of LIGO and the continued development of GW science and related technologies in the US for this new field to fulfill its potential in the coming decades.

- How to get this message across
- Must be through a process that is respected and credible within the broad scientific community and the science policy and funding communities. A process that is seen as objective and not as self-serving.

- Best bet--- A National Academy (National Research Council) study focusing on the scientific opportunities from the immerging field of GW astronomy and what would be needed in the coming decade and beyond to exploit these opportunities.
- Study members should include highly regarded scientists from other fields.
- Such studies have been used successfully by other fields to “promote” new scientific opportunities in the past.

- These studies are time consuming and expensive and should be requested and funded by a funding agency—so we should work to get NSF to request and fund such a study. If NSF is willing to do so it will signal NSF interest in the future of the field.
- Note about a different approach-A standing advisory committee (e.g. like HEPAP). I do not favor this *at this time*. Such committees usually are asked to advise about specific issues or decisions to be made. I don't think our field will be there until we are considering a new facility (not just a few x \$10M upgrade).

- Question—What is the best timing for a National Academy study?
- After first detection? After enough detections that we know rates for various types of sources are high enough to support GW astronomy? After we're doing real astronomy with astronomy community so we have credibility with them? After detailed studies of a new facility for the 2030s?
- My view--early but when the field has enough credibility to be taken seriously in competition with other science's needs.

- Because of the long lead-time between trying to get NRC study to happen and such a study having impact the right time is ---
- After first detections. Hopefully during study we will have enough detections that we know there are enough sources so there's a firm basis to argue that robust GW astronomy is likely.

- **Addition to Beverly's questions—**
- In the long run is our field physics or astronomy?
- My answer—Physics for the next decade. Our support has been physics in NSF from the beginning and we/they should capitalize on their billion \$ investment. We are vulnerable in the short term if we have to compete with other astronomy needs for resources.
- For example, we do not want to be part of the astronomy decadal survey for the 2020's

- But if we want to look more than a decade ahead to new facilities (e.g. 40 km detectors) in the 2030s that might require a billion \$ scale new investment, that will require support (of all kinds) from both the physics and astronomy communities. So we will be competing for big resources with other expensive big science opportunities in both physics and astronomy.
- And at that scale of cost such a project may well need international funding.