Lunar Gravitational Wave Antenna

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Detector concept

- Inertial sensing of **seismic motion**
- The lunar seismic background is much quieter than the Earth's
- Permanently shadowed region at the pole, $T \sim 40$K
- **Cryogenic** operation at $T \sim 4$K
- **SQUID** or interferometric readout

Science targets

- **Multibanding** for BNS (and BBH)
- **Intermediate mass** BBH (horizon at $z \gtrsim 50$ for $10^3 M_\odot \lesssim M \lesssim 10^4 M_\odot$)
- Extreme and **intermediate mass ratio** inspirals
- Neutron star-**white dwarf** and double white dwarf binaries
- **Lunar science**: formation history, geologic models…

Forecasting

The ingredients required to make a forecast:

- Displacement **sensitivity** estimates
- Lunar **response** to GWs
- Seismic **background** model
- Fisher matrix approach (assuming a matched-filtering search)
- Lunar motion in the Solar System

Work within this poster is preliminary: the LGWA collaboration is writing the whitepaper in these months. The mission is planned for the 2030s.

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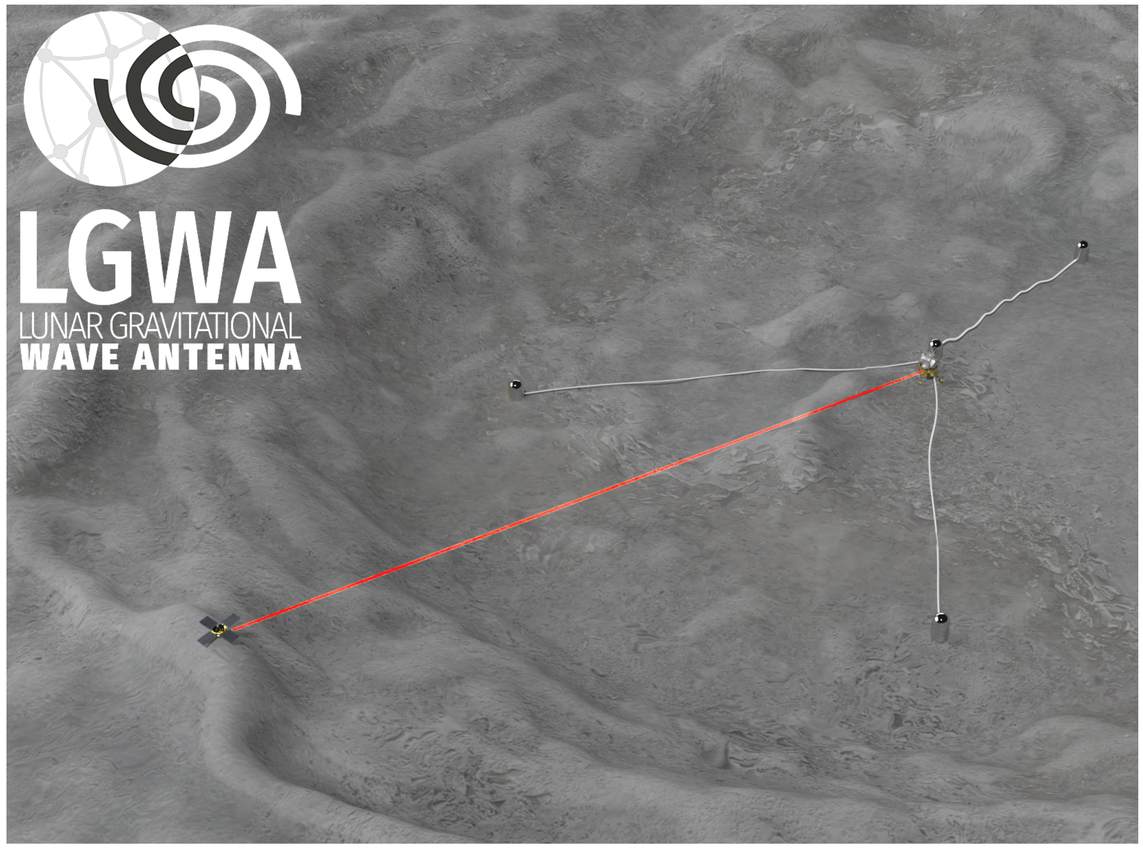
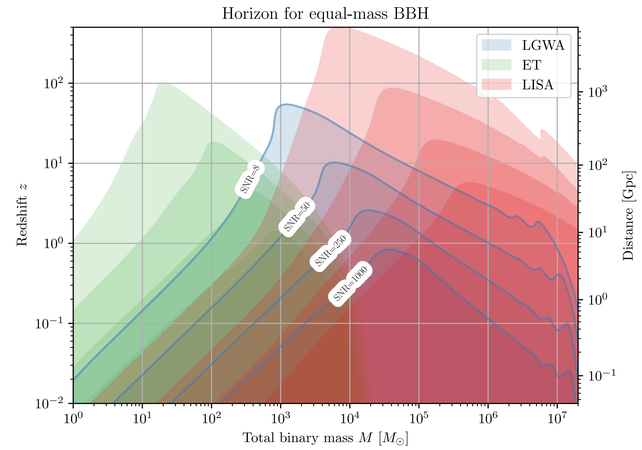
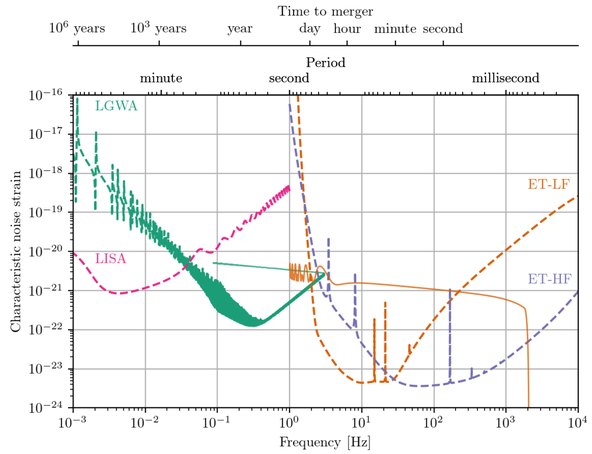
Extremely sensitive **seismometers**, deployed in a crater at the **Moon**'s pole, for deci-Hertz gravitational wave science.



Horizon for IMBH binaries



Sensitivity curve and multibanding



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