

# Detecting Gravitational Waves on Earth

## Interferometers

- Why do we use timing measurements to gauge distance?
- Timing/phase measurements
- Detector Response

## (Gaussian) Noise Sources

- Noise Budget
- Isolation techniques

## (non-Gaussian) Noise Sources

- Example of “glitches”
- Mitigation with statistical inference and machine learning

## Other detection techniques

- LISA: LIGO “in space”
- Pulsar Timing Arrays: even bigger timing measurements
- Atom Interferometers
- Resonating bar detectors: ringing a bell

## Suggested Reading

- *Gravitational Wave Detection: Principles and Practice*  
(<https://dcc.ligo.org/LIGO-P1100131/public>).
- *If light waves are stretched by gravitational waves, how can we use light as a ruler to detect gravitational waves? American Journal of Physics, 65, 501 (1997).*
- *Public LIGO-Virgo Summary Pages.* [https://www.gw-openscience.org/detector\\_status/](https://www.gw-openscience.org/detector_status/)
- *Thirsty The Raven.* <https://humansofligo.blogspot.com/2018/10/thirsty-raven.html>
- *Gravity Spy.* <https://www.zooniverse.org/projects/zooniverse/gravity-spy>