The First Gravitational Wave Catalog, GWTC-1
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What are Gravitational Waves (GWs)? Cosmic earthquakes!

- Ripples in space and time, caused when extremely heavy objects move extremely fast.
- Similar to how objects dropped in water make waves

Why study GWs? Unraveling the mysteries of gravity!

- GWs pass unperturbed through matter.
- Only known way to observe Black Holes
- Study the structure of Neutron Stars
- “Hear” the big bang!

How do we model and analyze GWs? Supercomputers

- Simulate GWs on supercomputers at Georgia Tech
- Analyze data from LIGO and Virgo using supercomputers at Georgia Tech

How do we detect GWs? Massive Lasers!

- GWs stretch and squeeze spacetime.
- Lasers are sensitive to length changes.

Heard a Gravitational Wave (GW) lately? We heard 11!

- First Catalog of Gravitational Wave events.
- Each Black Hole between 10 to 50 times as massive as the sun!

Conclusions and impact. We now know how Gold is made!

- First set of direct observation of Black holes!
- Binary Neutron star kilonova confirms nucleosynthesis of heavier elements like gold.

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