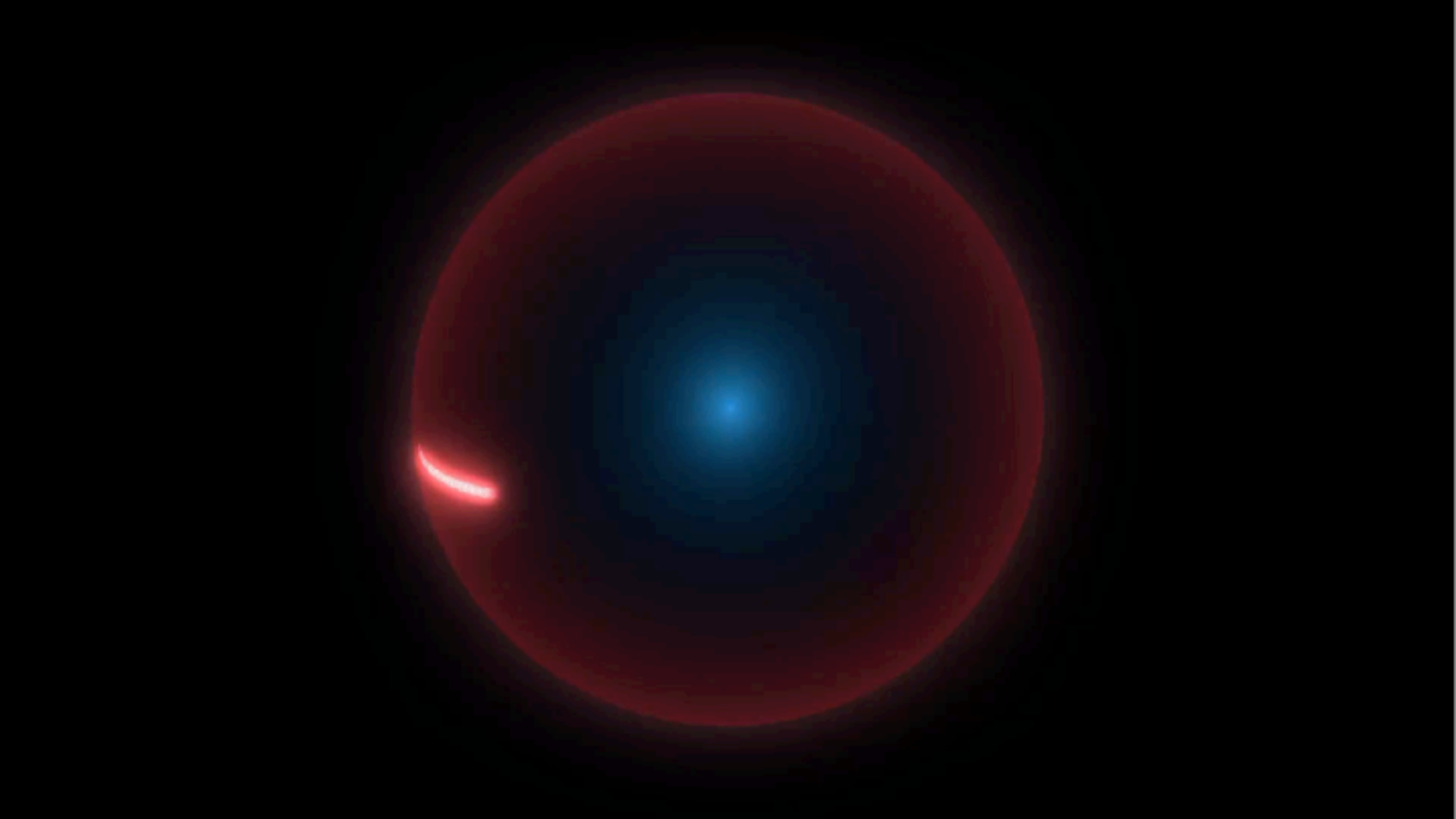


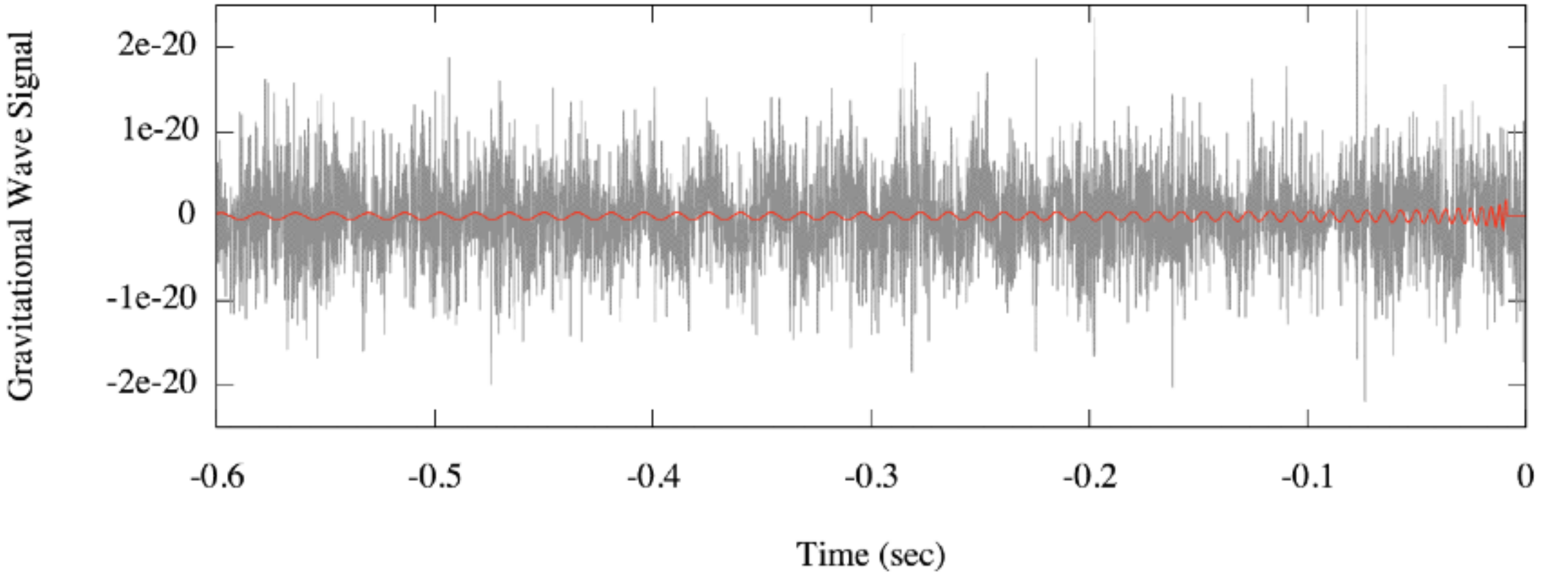
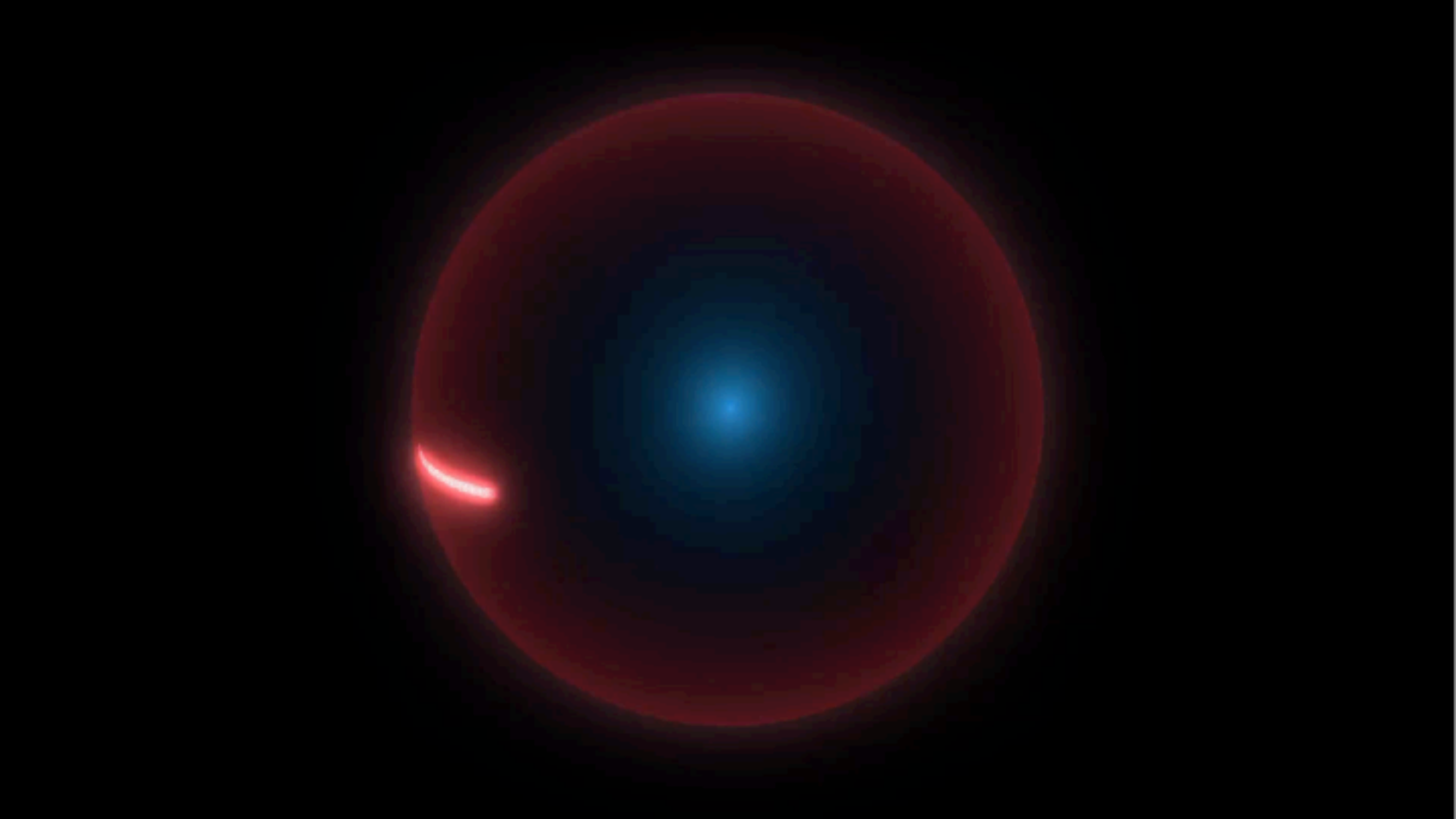
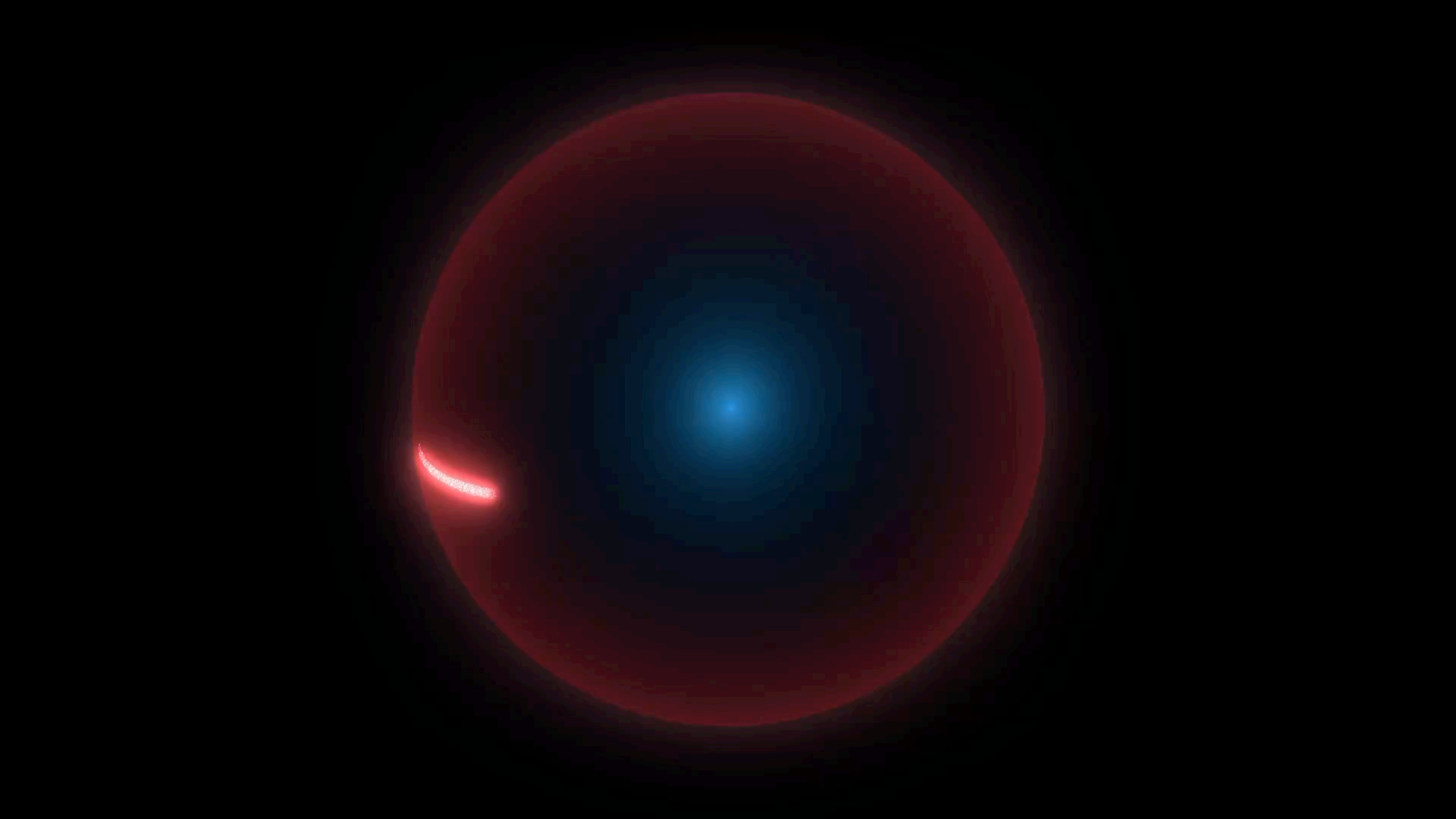

Gravitational Wave Signal
2e-20
1e-20
0
-1e-20
-2e-20
-0.6
-0.5
-0.4
-0.3
-0.2
-0.1
0
Time (sec)

Image: LIGO

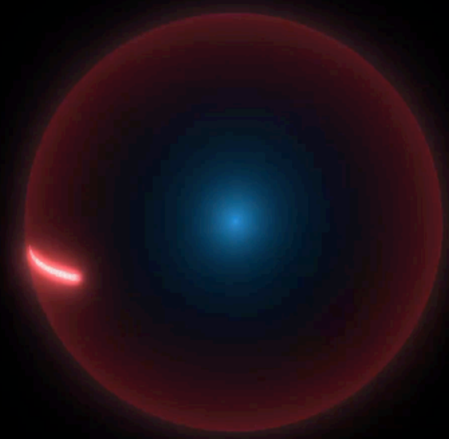
Candidate waveform





GRAVITATIONAL WAVE ASTRONOMY

- Ripples in spacetime stretch & shrink distances slightly
- Sensitive interferometers at two LIGO (🇺🇸) sites, Virgo (🇮🇹), & KAGRA (🇯🇵) measure this
- Noise-dominated, rely on *matched filtering*: We measure the signal-to-noise ratio of a *candidate waveform*
- **Sensitivity depends on accuracy of waveform models → numerical relativity**



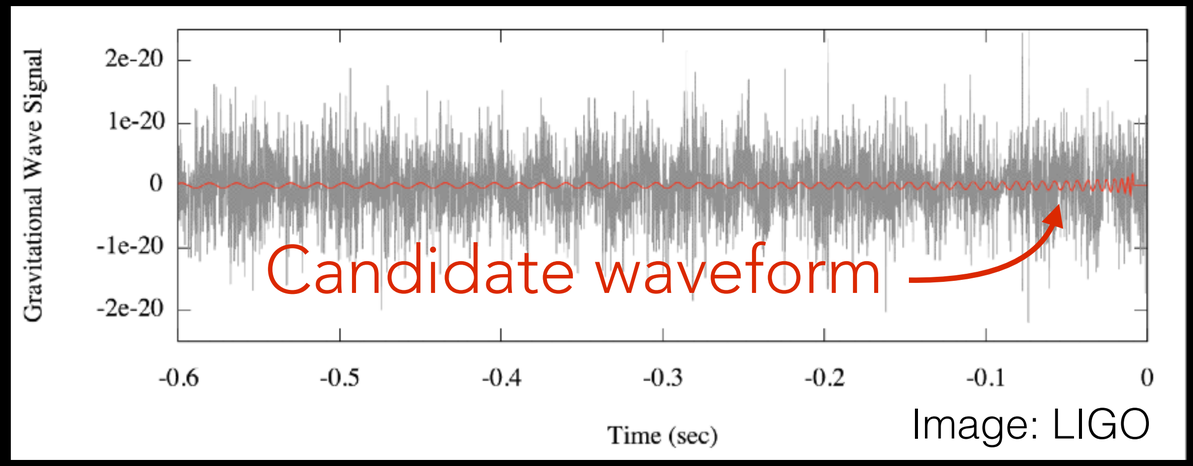


Image: LIGO

ERIK WESSEL

SPEC: HIGHLY ACCURATE GW WAVEFORMS

- Need high accuracy for detection
- Spectral methods: converge to extreme accuracy
- SXS collaboration Caltech
- GWs detected in 2015, hundreds of detections since, using SPEC-produced waveforms