

## Gravitational Wave Astrophysics: Opening the New Frontier

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A new era in astronomy will begin when the gravitational wave window onto the universe opens in  $\sim 5$  years, as ground-based detectors make the first detections in the high-frequency regime. Since the universe is nearly transparent to gravitational waves, these signals carry direct information about their sources - such as masses, spins, luminosity distances, and orbital parameters - through dense, obscured regions across cosmic time. This talk will explore gravitational waves as cosmic messengers, highlighting key sources and opportunities for multi-messenger astronomy across the gravitational wave spectrum.