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LIGHTNING AND THUNDER: PROBING THE DYNAMIC UNIVERSE USING MULTIPLE MESSENGERS

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Astronomy is undergoing a revolution. The perception of the night sky as static and unwavering has been rewritten over the past several decades as astronomers have developed new tools that routinely discover “transients”---dynamic astrophysical events that shine and fade over human timescales. These phenomena are often associated with dramatic cataclysmic events such as stars colliding, exploding, or being torn apart, and therefore provide a unique testbed for studying extreme physics. This has been amplified in recent years as a new window into the dynamic Universe has opened with the groundbreaking detection of gravitational waves. Combining both light and gravitational waves from transient astrophysical sources allows a “multi-messenger” view of the cosmos that can produce transformational advances. In this talk I will give an overview of recent progress in time-domain and gravitational-wave astrophysics and give examples of the power of multi-messenger science.