



Prospects in Theoretical Physics

Gravitational Waves From Theory to Observation July 14-25, 2025

The school will explore the field of gravitational wave physics and astrophysics, bridging the gap between theory and observation. Gravitational waves offer a unique window into the Universe, allowing us to probe extreme astrophysical environments and primordial cosmological epochs. Gravitational waves also allow for powerful tests of general relativity in the strong field regime.

Over the last decade, the direct detection of gravitational waves has opened up new avenues of research, driving rapid advancements in theoretical modeling, observational techniques, and data analysis. The school will provide a comprehensive overview of the field's current state, covering key theoretical tools, the latest developments in modeling gravitational wave sources, and state-of-the-art methods in data analysis. These tools are essential for extracting physical insights from current observations and will be a critical foundation for interpreting data from more sensitive upcoming detectors.

Preliminary Speakers:

Bruce Allen (MPI for Gravitational Physics); Emanuele Berti (Johns Hopkins); Neil Cornish (MSU); Maya Fishbach (Toronto); Luis Lehner (Perimeter); Chiara Mingarelli (Yale); Patricia Schmidt (Birmingham); Tejaswi Venumadhav Nerella (UCSB); Barak Zackay (Weizmann); Matias Zaldarriaga (IAS)

List of Topics:

Waveform models • Numerical Relativity • Gravitational Wave Searches • Parameter Estimation
Pulsar Timing Arrays • Astrophysics of Gravitational Wave Sources and interpretation of current
observational data.

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APPLICATION DEADLINE: March 1, 2025

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