

Workshop I: Computational Challenges in Multi-Messenger Astrophysics

Monday October 4, 2021

- 8:00–8:55 *Check-In/Light Breakfast (Hosted by IPAM)*
- 8:55–9:00 *Welcome & Opening Remarks: Dean Miguel García-Garibay (Dean of Physical Sciences, UCLA) and Dima Shlyakhtenko (Director, IPAM)*
- 9:00 *Session Chair: Marco Cavaglia (Missouri S&T)*
- 9:00–9:50 **Pablo Cerdá-Durán** (University of Valencia)
Virtual Talk: Understanding gravitational waves from core collapse supernovae
- 10:00–10:15 *Break*
- 10:15–11:05 **David Radice** (Pennsylvania State University)
Binary neutron star mergers
- 11:15–11:30 *Break*
- 11:30–12:20 **Ryan Quitzow-James** (Missouri University of Science and Technology)
Searching for Gravitational Waves from Magnetar Bursts
- 12:30–2:00 *Lunch (on your own)*
- 2:00–2:50 **Anthony Mezzacappa** (University of Tennessee)
The Computational Challenges associated with Modeling Core Collapse Supernovae and their Gravitational Wave Emission
- 3:00–3:15 *Break*
- 3:15–4:05 **Kei Kotake** (Fukuoka University)
Multi-dimensional modeling of core-collapse supernovae: neutrino and gravitational-wave signatures
- 4:15–4:30 *Lightning Poster Presentations*
- 4:30–5:45 *Poster Session & Reception (Hosted by IPAM)*

Tuesday October 5, 2021

- 8:00–9:00 *Check-In/Breakfast (Hosted by IPAM)*
- 9:00 *Session Chair: Mairi Sakellariadou (King's College London)*
- 9:00–9:50 **Luciano Rezzolla** (Johann Wolfgang Goethe-Universität Frankfurt)
Virtual Talk: Binary neutron stars: from gravitational to particle physics
- 10:00–10:15 *Break*

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- 10:15–11:05 **Miguel Ángel Aloy** (University of Valencia)
Virtual Talk: Assessing the dependence of magnetic fields and rotation of massive stars in the properties of their compact remnants
- 11:15–11:30 *Break*
- 11:30–12:20 **Ariadna Murguía-Berthier** (University of California, Santa Cruz)
Virtual Talk: Implementing a tabulated EOS and neutrino leakage scheme in HARM3D
- 12:30–2:30 *Lunch (on your own)*
- 2:30–3:20 **Susana Serna** (Autonomous University of Barcelona)
Capturing complex dynamics in non-convex special relativistic hydrodynamics
- 3:30–4:00 *Break*
- 4:00–4:50 **Masaru Shibata** (Kyoto University)
Virtual Talk: Post-merger mass ejection of binary neutron stars: low total-mass cases

Wednesday October 6, 2021

- 8:00–9:00 *Check-In/Breakfast (Hosted by IPAM)*
- 9:00 *Session Chair: Susana Serna (Autonomous Univ. of Barcelona)*
- 9:00–9:50 **Riccardo Ciolfi** (INAF - Astronomical Observatory of Padova)
Virtual Talk: Simulating SGRB jets from BNS mergers
- 10:00–10:15 *Break*
- 10:15–11:05 **Agnieszka Janiuk** (Polish Academy of Sciences (PAN))
Virtual Talk: Many faces of black hole accretion in gamma ray bursts
- 11:15–11:30 *Break*
- 11:30–12:20 **Carlos Lousto** (Rochester Institute of Technology)
Virtual Talk: From numerical simulations of binary black hole mergers to insights into astrophysics and gravitational waves
- 12:30–2:00 *Lunch (on your own)*
- 2:00–2:50 **Deirdre Shoemaker** (University of Texas at Austin)
Virtual Talk: Numerical Relativity and the Next Generation of Gravitational Wave Detections
- 3:00–3:15 *Break*
- 3:15–4:05 **Jade Powell** (Swinburne University of Technology)
Virtual Talk: Detecting gravitational waves from core-collapse supernovae

Thursday October 7, 2021

- 8:00–9:00 *Check-In/Breakfast (Hosted by IPAM)*
- 9:00 *Morning Session Chair: Helvi Witek (University of Illinois)*
- 9:00–9:50 **Irene Di Palma** (Sapienza University of Rome)
Virtual Talk: A Machine Learning Application in Multi-Messenger Astrophysics
- 10:00–10:15 *Break*
- 10:15–11:05 **Philippe G. LeFloch** (Sorbonne University, Paris)
Virtual Talk: Gravitational singularities, massive fields, and asymptotic localization
- 11:15–11:30 *Break*
- 11:30–12:20 **Manuela Campanelli** (Rochester Institute of Technology)
Virtual Talk: Merging black hole binaries: accretion dynamics and outflows
- 12:30–2:00 *Lunch (on your own)*
- 2:00 *Afternoon Session Chair: David Radice (Penn State)*
- 2:00–2:50 **Jeffrey Winicour** (University of Pittsburgh)
Multi-Messenger Aspects of Characteristic Evolution
- 3:00–3:15 *Break*
- 3:15–4:05 **Helvi Witek** (University of Illinois)
The adventures of black holes: the case of quadratic gravity
- 4:15–4:30 *Break*
- 4:30–5:20 **Maria Hamilton** (Marshall University)
Realistic Binary Neutron Stars Collisions Simulations: Challenges and Opportunities

Friday October 8, 2021

- 8:00–9:00 *Check-In/Breakfast (Hosted by IPAM)*
- 9:00 *Session Chair: Anthony Mezzacappa (Univ. Tennessee)*
- 9:00–9:50 **Harald Pfeiffer** (Max Planck Institute für Gravitationsphysik, Albert-Einstein-Institut)
Virtual Talk: Numerical relativity: Exploring new capabilities with binary black holes
- 10:00–10:15 *Break*
- 10:15–11:05 **Carlos Palenzuela** (University of the Balearic Islands (Illes Balears))
Magnetic field amplification in binary neutron star mergers
- 11:15–11:30 *Break*

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11:30–12:20 **Luis Lehner** (Perimeter Institute for Theoretical Physics)
Virtual Talk: Challenges and options for beyond General Relativity explorations

12:30–1:00 *Closing Discussion and Wrap Up*

