

Princeton Center for Theoretical Science

The Princeton Center for Theoretical Science is dedicated to exploring the frontiers of theory in the natural sciences. Its purpose is to promote interaction among theorists and seed new directions in research, especially in areas cutting across traditional disciplinary boundaries.

The Center is home to a corps of Center Postdoctoral Fellows, chosen from nominations made by senior theoretical scientists around the world. A group of senior Faculty Fellows, chosen from science and engineering departments across the campus, are responsible for guiding the Center. Center activities include focused topical programs chosen from proposals by Princeton faculty across the natural sciences. The Center is located on the fourth floor of Jadwin Hall, in the heart of the campus “science neighborhood”. The Center hopes to become the focus for innovation and cross-fertilization in theoretical natural science at Princeton.

Faculty Fellows

Paul Steinhardt, Director
Igor Klebanov, Associate Director
Andrei Bernevig
Duncan Haldane
Andrew Houk
Eve Ostriker
Thanos Panagiotopoulos
Frans Pretorius
Ned Wingreen

Center Postdoctoral Fellows

Ricard Alert-Zenon 2018-2021
Nathan Benjamin 2018-2021
Fani Dosopoulou 2018-2021
Anna Frishman 2016-2019
Daniel Lecoanet 2016-2019
Biao Lian 2017-2020
Abhinav Prem 2018-2021
Pierre Ronceray 2016-2019
Oren Slone 2018-2020
Yizhi You 2017-2020
Xinan Zhou 2018-2021

To find out more about Center Postdoctoral Fellowships and Programs see:

<http://pcts.princeton.edu/pcts>



TEAMS Annual Collaboration

Explosive Nucleosynthesis in the Supernova and Merging- Neutron-Star Contexts

May 22-24, 2019

Organizers

Adam Burrows (Princeton University)
Sean Couch (MSU)
Christopher Fryer (LANL)
W. Raphael Hix (ORNL)
Daniel Kasen (Berkeley)
Michael Zingale (Stony Brook)

Explosive Nucleosynthesis in the Supernova and Merging-Neutron-Star Contexts

Wednesday, May 22, 2019

Talks should be 25 minutes + 20 minutes for Q&A Discussion

8:30–8:55 Light Breakfast

8:55-9:00 Welcome/Introduction

9:00-9:45 Modeling Core-Collapse Supernovae, and their Nucleosynthesis, with CHIMERA
W. Raphael Hix, ORNL

9:45-10:30 Non-spherical Cows: Next-generation Multidimensional Stellar Models for Core-collapse Supernova Simulations and Their Impact
Sean Couch, Michigan State University

10:30-11:00 Coffee break

11:00-11:45 New Three-dimensional Models of Core-Collapse Supernova Explosions
Adam Burrows, Princeton University

11:45-1:30 Lunch at PCTS

1:30-2:15 Cosmic Chandlery with Thermonuclear Supernovae
Alan Calder, Stony Brook University

2:15-3:00 Core-Collapse Supernova Simulations with High-Order Magnetohydrodynamics in FLASH
Chelsea Harris, Michigan State University

3:00-3:30 Coffee Break

3:30-4:15 Numerical Relativity Simulations of Neutron Star Mergers
David Radice, Princeton University

4:15-5:00 Uncertainty Quantification in Modeling Kilonova Emission"
Christopher Fryer, LANL

5:45 pm Dinner at Triumph Brewery

Thursday, May 23, 2019

8:30 Light Breakfast

Thursday, May 23, 2019 (cont.)

9:00-9:45 Recent calculations of neutrino mean free paths in dense matter
Sanjay Reddy, University of Washington

9:45-10:30 Influence of statistical uncertainties of Skyrme-type nuclear mass models on r-process nucleosynthesis simulations
Trevor Sprouse, Notre Dame

10:30-11:00 Coffee break

11:00-11:45 Equation of state tables matching theory, observations, and experiment
Xingfu Du, University of Tennessee

11:45-1:30 Lunch at PCTS

1:30-2:15 ExaStar: Towards Multi-physics Stellar Astrophysics on ExaFLOP computers
O.E. Bronson Messer, ORNL

2:15-3:00 MAESTROeX: a low Mach number hydrodynamics code for future exascale systems
Doreen Fan, LBNL

3:00-3:30 Coffee Break

3:30-4:15 MAESTROeX: science applications and future developments
Alice Harpole, Stony Brook University

4:15-5:00 Collaboration Discussion Session

5:00 RECEPTION AT PCTS

Friday, May 24, 2019

8:30 Continental Breakfast

9:00-9:45 Collective neutrino oscillations in core-collapse supernovae
Luke Johns, UCSD

9:45-10:30 Full Transport GR Neutrino Radiation MHD and Nucleosynthesis in Neutron Star Merger Disks
Josh Dolence, LANL

10:30-11:15 Collaboration Discussion Session

11:15-11:30 Conclusion, followed by lunch at PCTS