



21st Midwest Relativity Meeting

Departments of Physics and Astronomy

University of Illinois at Urbana Champaign

November 4-5, 2011



Friday, November 4, 2011

8:00am Continental Breakfast and Registration

8:40am Opening – **Stu Shapiro**, University of Illinois

8:45am Welcome – **Charles F. Gammie**, Head, Department of Astronomy, University of Illinois

Session I: Black Holes/Cosmology – Chair: Sam Finn

8:50am **Arif Mohd*** (*University of Mississippi*) – Membrane paradigm and η /s: Gauss-Bonnet gravity

9:02am **Robert Wald** (*University of Chicago*) – Stability of black holes and black branes

9:14am **Ko Sanders** (*University of Chicago*) – Wick rotation and thermal states in static spacetimes

9:26am **Joshua Schiffrin*** (*University of Chicago*) – Measure and probability in cosmology

9:38am **Stephen Green*** (*University of Chicago*) – Newtonian and relativistic cosmologies

9:50am **David Garfinkle** (*Oakland University*) – How extreme are extreme black holes?

10:02am **Majd Abdelqader*** (*Queen's University*) – Exploring the global structure of the Curzon-Chazy metric by analyzing the Weyl scalar

10:14am **Eric Poisson** (*University of Guelph*) – Intrinsic and extrinsic geometries of a tidally deformed black hole

10:26am **Hugues Beauchesne*** (*Bishop's University*) – Emergence of a thin shell structure during gravitational collapse in isotropic coordinates

10:38am **Sean Stotyn*** (*University of Waterloo*) – Black holes with only one Killing field in arbitrary odd dimension

10:50am Coffee Break

Session II: Numerical Relativity – Chair: Eric Poisson

- 11:15am **Nick Tacik*** (*University of Toronto*) – Parameter space dependence of junk radiation in binary black hole simulations
- 11:27am **Stu Shapiro** (*University of Illinois*) – Compact binaries in gaseous environments
- 11:39am **Yuk Tung Liu** (*University of Illinois*) – Improved EM gauge condition for GRMHD simulations with AMR
- 11:51am **Zachariah Etienne** (*University of Illinois*) – Simulations of magnetized BHNSs in full GR
- 12:03pm **Francois Foucart** (*CITA*) – Black hole-neutron star mergers for $10M_{\odot}$ black holes
- 12:15pm **Vasileios Paschalidis** (*University of Illinois*) – The Merger of binary white dwarf-neutron stars: simulations in full GR
- 12:27pm **Harald Pfeiffer** (*CITA*) – IMEX evolutions of black hole spacetimes
- 12:39pm **Richard Price** (*Univ. Texas at Brownsville*) – Black hole kicks, antikicks, and plunges
- 12:51pm **Serguei Ossokine*** (*CITA*) – Highly precessing binary black holes using the dual frame system

1:03pm Lunch Break (at the Krannert Center)

Session III: Gravitational Waves – Chair: Robert Wald

- 2:23pm **Ryan Lang** (*Washington University in St. Louis*) – Beyond LISA: Science reach of the new ESA gravitational wave detector
- 2:35pm **Daniel Holz** (*University of Chicago*) – Gravitational wave standard sirens
- 2:47pm **Sam Finn** (*Penn State*) – Luck favors the prepared mind: Gravitational wave astronomy

- 2:59pm **John Friedman** (*U of Wisconsin-Milwaukee*) – Radiation-gauge approach to self-force for circular orbits in Kerr
- 3:11pm **Diego Fazi** (*Northwestern University, CIERA*) – Development of a search for gravitational waves from spinning compact-object binaries with ground-based interferometers
- 3:23pm **Vivien Raymond*** (*CIERA, Northwestern University*) – Evidence for spin in compact binary coalescence: When can we trust it?
- 3:35pm **Carl Rodriguez*** (*Northwestern University*) – Detecting off-Kerr perturbations with intermediate mass ratio inspirals in the advanced LIGO era
- 3:47pm **Meagan Morscher*** (*Northwestern University*) – Stellar-mass black holes in star clusters: Implications for gravitational wave astronomy
- 3:59pm **Ben Farr*** (*Northwestern University*) – Re-purposed MCMC for low latency sky localization of gravitational wave sources
- 4:11pm Coffee Break**

Session IV: Field Theory/Compact Objects – Chair: Richard Price

- 4:36pm **Patrick Myers*** (*Kenyon College*) – Minimal length scale and its effect on Unruh radiation
- 4:48pm **Leonard Parker** (*U of Wisconsin-Milwaukee*) – Gravitationally stimulated creation of quanta
- 5:00pm **Razieh Pourhasan*** (*University of Waterloo*) – Chameleon gravity and kinematics in the outer Galaxy
- 5:12pm **Chris Creighton*** (*Wayne State University*) – The factor ordering problem in two-dimensional cosmologies
- 5:24pm **Eric Brown*** (*University of Waterloo*) – Alice falls into a black hole: Quantum correlations across the horizon.
- 5:36pm **Miok Park*** (*University of Waterloo*) – Deformations of Lifshitz holography in higher dimensions

- 5:48pm **Dinesh Singh** (*University of Regina*) – Local space-time curvature effects on quantum orbital angular momentum
- 6:00pm **Simin Mahmoodifar*** (*Washington University in St. Louis*) – Probing ultra-dense matter in neutron stars
- 6:12pm **Laleh Sadeghian*** (*Washington University in St. Louis*) – Dark matter distribution in the Schwarzschild geometry
- 6:24pm **Saeed Mirshekari*** (*Washington University in St. Louis*) – Faster or slower than light? Constraining Lorentz violation with gravitational waves

6:36pm End of First Day

Saturday, November 5, 2011

8:00am Continental Breakfast

Session V: Numerical Relativity/Computational Astrophysics – Chair: John Friedman

- 8:40am **Roseanne M. Cheng*** (*U of North Carolina at Chapel Hill*) – Stellar tidal encounters with a massive black hole
- 8:52am **Carlos Lousto** (*Rochester Institute of Technology*) – Hang up gravitational recoils
- 9:04am **Ian Ruchlin*** (*Rochester Institute of Technology*) – Solving black hole binary trumpet initial data with spectral methods
- 9:16am **Scott Noble** (*Rochester Institute of Technology*) – Bridging the gap: Circumbinary MHD accretion in the post-Newtonian regime
- 9:28am **Brian Farris*** (*University of Illinois*) – Binary black hole mergers in gaseous disks: Simulations in general relativity
- 9:40am **Roman Gold** (*University of Illinois*) – Tidal excitation of normal modes in eccentric binary neutron stars

- 9:52am **Carlos Palenzuela** (*CITA*) – Electromagnetic radiation from compact binary mergers
- 10:04am **Tony Chu** (*CITA*) – Including realistic tidal deformations in binary-black-hole initial data
- 10:16am **Scott Hawley** (*Belmont University*) – Spin-spin effects in models of binary black hole systems
- 10:28am **Maxim Lyutikov** (*Purdue University*) – Slowly balding black holes

10:40am Coffee Break

Session VI: Gravitational Waves/Neutron Stars – Chair: Harald Pfeiffer

- 11:05am **Marc Favata** (*UWM/Caltech*) – Spin effects in the nonlinear gravitational-wave memory from inspiralling binaries
- 11:17am **Lee Lindblom** (*Caltech*) – Spectral representations of neutron star equations of state
- 11:29am **Ben Lackey*** (*U of Wisconsin-Milwaukee*) – Detectability of equation of state parameters from black hole-neutron star inspiral
- 11:41am **Fredrick Jenet** (*Univ. Texas at Brownsville*) – Unique aspects of gravitational wave detection using radio pulsar timing techniques
- 11:53am **Justin Ellis*** (*U of Wisconsin-Milwaukee*) – Detection methods for continuous gravitational waves using pulsar timing data
- 12:05pm **Sydney J. Chamberlin*** (*U of Wisconsin-Milwaukee*) – Overlap reduction functions for pulsar timing arrays in alternative theories of gravity
- 12:17pm **Madeline Wade*** (*U of Wisconsin-Milwaukee*) – Using the measurability of spin in binary black hole systems to test cosmic censorship
- 12:29pm **Leslie Wade*** (*U of Wisconsin-Milwaukee*) – Continuous gravitational wave searches from galactic neutron stars in the advanced detector era

12:41pm **Matt Adams*** (*Montana State University*) – Separating a stochastic gravitational wave background from instrument noise and the galactic white dwarf foreground

12:53pm **Greg Comer** (*Saint Louis University*) – The spherically symmetric and static limit of multi-fluid compact stars

1:05pm Lunch Break

2:25pm David Garfinkle – Announcement of the Blue Apple Award

Session VII: Black Holes/Cosmology II – Chair: Carlos Lousto

2:30pm **Ian Vega** (*University of Guelph*) – Self-forced motion of a scalar particle around a Schwarzschild black hole

2:42pm **Seth Hopper** (*Albert Einstein Institute*) – Eccentric orbits on a Schwarzschild background: Transforming from Regge-Wheeler to Lorenz gauge

2:54pm **Cynthia Trendafilova** (*Texas A&M University*) – Static solutions of Einstein’s equations with cylindrical symmetry

3:06pm **Sharmanthie Fernando** (*Northern Kentucky University*) – Quasi normal modes of black holes

3:18pm **Rachel Maitra** (*Albion College*) – Quantum cosmology and the factor ordering problem

3:30pm **Marc Casals** (*Perimeter Institute for Theoretical Physics*) – Quantum states for fermions in Kerr

3:42pm **Robert McNees** (*Loyola University*) – Holographic renormalization of asymptotically Lifshitz spacetimes

3:54pm **Eyo Ita** (*US Naval Academy*) – Instanton representation of Plebanski gravity: Gravitational coherent states

4:06pm **Chad Middleton** (*Colorado Mesa University*) – Anisotropic evolution of 5D Friedmann-Robertson-Walker spacetime

4:18pm **Brett Bolen** (*Grand Valley State University*) – Undergraduate studies of Oppenheimer Snyder collapse

4:30pm Coffee Break

Session VIII: New Directions – Chair: Vasileios Paschalidis

4:55pm **Rickey Austin** (*NC A&T*) – Possible relationship between gravity, electromagnetic force and α

5:07pm **Wayne R Lundberg** – Information-preserving black holes

5:19pm **Richard Kriske** (*University of Minnesota*) – The horizon of the Universe may be similar to a black hole horizon, and may give rise to the mass cycles seen in particle physics

5:31pm **Hui Peng** (*Invenlux*) – Ground-based experiments to test magnetic-type gravitational force

5:43pm **Greg Proper** – A Model of a simple, baryon-dominated universe that expands at an ever-increasing rate without relying on vacuum energy (Λ)

5:55pm **Ajay Sharma** (*Fundamental Physics Society*) – Derivation of $\Delta E = \Delta mc^2$: Revisited

6:07pm **John Laubenstein** – Special relativistic effects may impact the conditions necessary for an event horizon

6:19pm End of Meeting

* graduate student