Welcome to the Center for Cosmology and Particle Physics

2019 edition

Outline

- What We Do
- How We Communicate
- How We Behave
- Who We Are
- New Faces
- Partnerships
- Assessing Where We Are At

Events of the CCPP

- Brown Bag: Mondays 12:30pm, followed by cookies.
  - *Mostly* blackboard talks — use slides only in case of emergency
  - *Internal* and *understandable to string theorists and astronomical observers*
  - The anthropic principle can only be mentioned to justify not immediately rejecting string theory.
- Astrophysics Seminar: Tuesdays 2:00pm
- High Energy Physics Seminar: Wednesdays 2:00pm
- astro-ph coffee: Thursdays 12:00pm
- Big Apple Colloquium: Fiona Harrison, November 22
- Other group meetings throughout the week.

Physics in a Vacuum Minisymposium

- Brown Bag time: Monday Sept 16
  - *11:00am - Experiment Particle Physics (EPP) lab tour*
  - *12:00pm - Pizza*
  - *12:30pm - CCPP Faculty introductions*
  - *1:30pm - Cookies*
- Overview of research in CCPP
- First-year graduate students will be invited so they can learn about opportunities in this group.

Communications of the CCPP

- Web site: https://cosmo.nyu.edu/
  - *Events, news, emails etc.*
- Email list: cpp_@physics.nyu.edu
  - *Ask Jennifer Morral (jam43@nyu.edu) to get on the list*
  - *Weekly & daily updates on events*

Behavior in the CCPP

- Intellectual progress requires critical engagement.
- Productive criticism requires an atmosphere of mutual trust.
- So … be careful in how you communicate.
  - *use welcoming and respectful language*
  - *encourage participation and questions from all members*
  - *respect preferences regarding forms of address (he, she, they)*
  - *harassment and discrimination is not acceptable*
- Link with many relevant university policies: *https://www.nyu.edu/faculty/governance-policies-and-procedures/faculty-handbook/selected-university-policies.html*

Behavior in the CCPP

- ALSO: common areas are ALL of our responsibility.
- Please clean up after yourselves.
- There is nobody whose job it is to make sure that a plate or cup left in a conference room or table is put in the dishwasher, or to do your dishes.

Who we are: *2 full-time staff*

- Jennifer Morral
  (Administrator)

- Mulin Ding
  (Systems Administrator)

Jennifer and Mulin are among the very best support staff I've worked with here and elsewhere. We need to consciously continue to respect their time and appreciate their significant contribution to our success.

Who we are: *18 faculty*

- Yacine Ali-Haïmoud
- Michael Blanton
- Kyle Cranmer
- Sergei Dubovsky
- Georgi Dvali
- Glennys Farrar
- Gregory Gabadadze
- Andrei Gruzinov
- David Hogg
- Matthew Kleban
- Andrew MacFadyen
- Maryam Modjaz
- Massimo Porrati
- Anthony Pullen
- Joshua Ruderman
- Roman Scoccimarro
- Jeremy Tinker
- Neal Weiner

Who we are: *17 postdocs*

- Ken Van Tilburg
- Mehmet Alpaslan
- Richard Galvez
- Derek Inman
- Uri Kol
- Ben Pope
- Sjoert Van Velzen
- Tyler Pritchard
- Mikhail Ivanov
- David Pirtskhalava
- Masha Baryakhtar
- Siddharth Mishra-Sharma
- Wolfgang Kerzendorf
- Noemie Globus
- Asher Berlin
- Hongwan Liu
- Abhishek Maniyar

Who we are: ~ *43 graduate students*

- Peter Conkey
- Di Liu
- Xingchen Xu
- Valentino Foit
- Oliver Janssen
- Sicheng Lin
- Giorgi Tukhashvili
- Siqing Yu
- Cheuk Yin Yu
- Junzhi (Jason) Cao
- Chang Chen
- Dou Liu
- Cristina Mondino
- Marco Muzio
- Daniel Older
- Thomas Simmons
- Digvijay Wadekar
- Po-JenWang
- Quynh Nguyen
- Xuyao Hu
- Reza Javadi Nezhad
- Trey Jensen
- Christopher Tiede
- Marc Williamson
- Shengqi Yang
- Zihui Wang
- John Donahue
- Hun Jang
- Ekapob Kulchoakrungsun
- Austin McDowell
- Milad Noorikuhani
- Kate Storey-Fisher
- Xingyang Yu
- Yucheng Zhang
- Panagiotis Charalambous
- Xucheng Gan
- Suroor Gandhi
- Joan Manuel La Madrid
- Nanoom Lee
- Jiarong Zhu
- Giorgi Arsenadze
- Marcus DuPont
- Nicolas Loizeau

New Graduate Students:

Panagiotis Charalambous (Dubovsky): *black hole Love numbers*

New Graduate Students:

Jack Donahue (Dubovsky):
confining strings

New Graduate Students:

Marcus DuPont (MacFadyen):
using JetFit to perform MCMC analysis of the light curves of gamma-ray burst afterglows.

New Graduate Students:

Xucheng Gan (Ruderman):
new theories for dark matter and how to test them

New Graduate Students:

Nanoom Lee (Haïmoud):
Efficient calculation of cosmological recombination.

New Graduate Students:

Nicolas Loizeau (Farrar): *First year PhD student with research interests in astrophysics with emphasis on dark matter; masters in complex systems and some previous research in quantum information."*

New Graduate Students:

Joan Manuel La Madrid (Dubovsky): *how superradiance affects supermassive black hole growth*

New Graduate Students:

***Austin McDowell (MacFadyen)**: afterglows of binary neutron star mergers and other gamma-ray bursts using theoretical light curves generated by hydrodynamical simulations of relativistic jets.*

New Graduate Students:

Zihui Wang (Farrar): *Particle nature of dark matter, it is produced in the early Universe and where we can detect their signals. Currently working with Glennys Farrar on the experimental constraints on dibaryon dark matter.*

New Graduate Students:

Jiarong Zhu (Farrar):
Astrophysics!

New Postdocs:

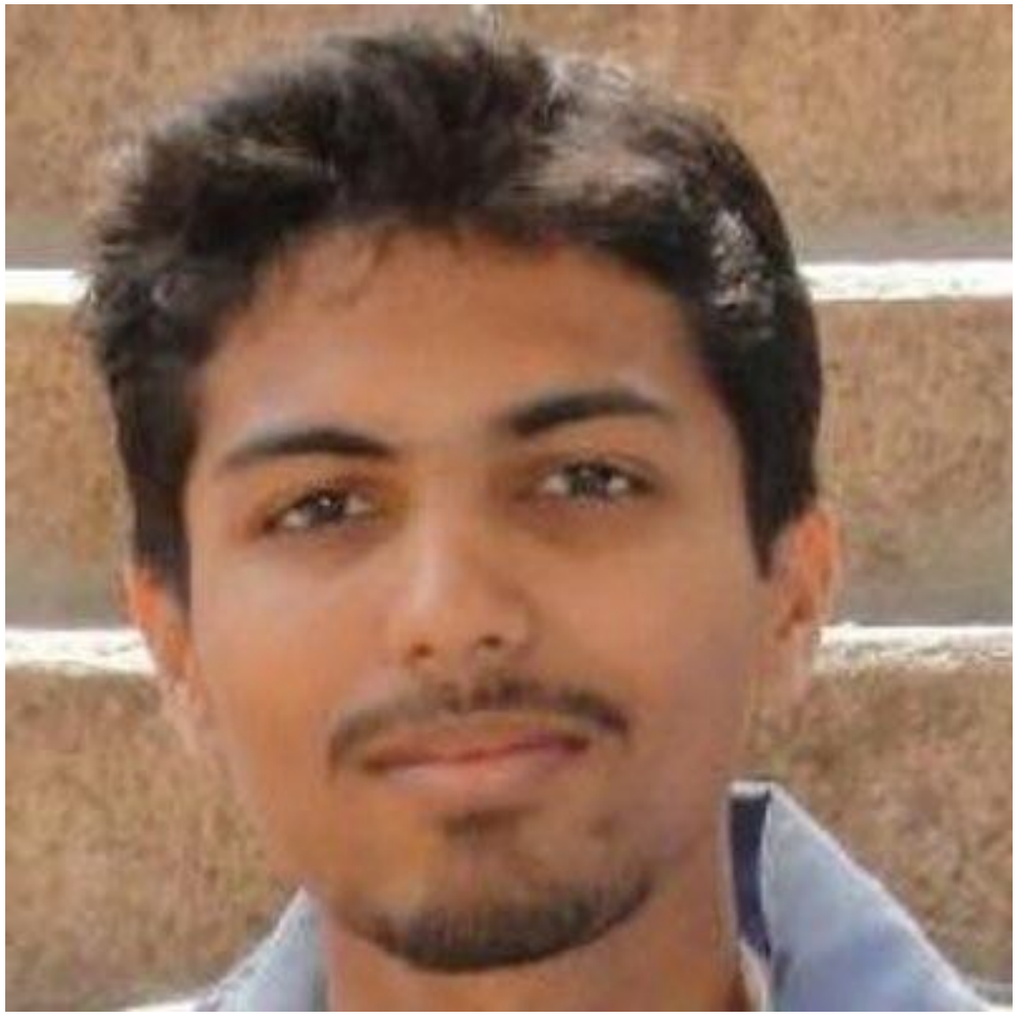
***Asher Berlin**: James Arthur Postdoctoral Fellow. Particle physics and dark matter detection.*

New Postdocs:

***Hongwan Liu**: dark matter cosmology and detection*

(at least, I'm pretty sure this is our Hongwan)

New Postdocs:



Abhishek Maniyar: *dark matter cosmology and detection*

(again, reasonably sure, if Twitter can be trusted)

CAP³: *Center for Astro, Particle, Planetary Physics*

- A new center supporting NYU Abu Dhabi astronomers and physicists
  - *Francesco Arneodo: astrophysics, particle physics*
  - *Ian Dobbs-Dixon: planetary interiors, atmospheric dynamics*
  - *Yosi Gelfand: supernovae, stars, pulsar wind nebulae*
  - *Andrea Macciò: dark energy, dark matter, galaxies, black holes*
  - *David Russell: black holes, neutron stars*
  - *Ingyin Zaw: particle physics, astronomy*
- Hiring 5 new research associates soon.
- Funding for visits & collaboration with NYU NY.
- PhD program in Physics at AD means that we have more first-year graduate students among us interested in CCPP topics!

Other partnerships to take advantage of

- Flatiron Institute & its Center for Computational Astrophysics
  - *several joint affiliations (Gabadadze, Hogg, Pullen, others??)*
  - *joint cosmology meeting*
  - *Flatiron group meetings often quite open to NYC participants*
- Center for Data Science
  - *affiliated postdocs & faculty (e.g. Pope, Cranmer)*
  - *many areas of common interest*

Where are we at … and where should we go?

- CCPP is nearly twenty years old. It was a prescient idea at the time, and dramatically jump-started cosmology and particle physics at NYU (thanks Glennys!)
- Time to assess:
  - *what have we achieved?* → $\int_{2000}^{2019} \mathrm{d}t \, \frac{\mathrm{d}\,\mathrm{Science}}{\mathrm{d}t}$
  - *are we still achieving our goals effectively?* → $\left.\frac{\mathrm{d}\,\mathrm{Science}}{\mathrm{d}t}\right|_{2019}$
  - *are we healthy to continue doing so?* → $\sim \left.\frac{\mathrm{d}^2\,\mathrm{Science}}{\mathrm{d}t^2}\right|_{2019}$
- This will be a focus for me this year, through conversation, surveys, and "other means."
- Next year: are we thinking the right way for the *next* twenty years?