

Observational Astrophysics

The variety is astronomical! We study stellar life cycles from star-forming clouds to compact remnants, gamma-ray bursts, stellar and Big Bang nucleosynthesis, extrasolar planets, stellar seismology, stellar populations and clusters, galaxy evolution, active galactic nuclei, cosmic large-scale structure, and the nature of dark matter and dark energy.



You will use UNC's suite of optical/IR telescopes as well as space-based gamma-ray, UV, optical, and infrared

telescopes and premier international mm and radio facilities.

Instrumentation

No matter whether you're interested in the farthest galaxies, the coolest exoplanets, or the most massive stellar explosions, you'll need state-of-the-art instruments. At UNC we're building new types of spectrographs, adaptive optics systems, arrays of small telescopes, and ultra-wide-field survey cameras.



We are partners in the SOAR, SALT, and PROMPT/SkyNet telescopes, and we test and operate our instruments in Chile and at other world-class observing sites. We also use many of

our instruments remotely or even robotically from Chapel Hill.

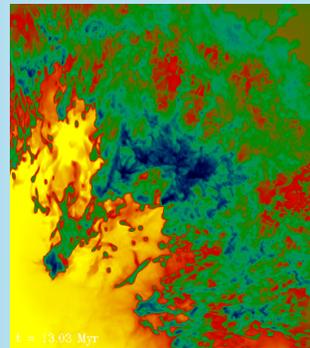


Nuclear & Particle Astrophysics

What are the properties of neutrinos? What is dark matter? What nuclear reactions power stars? Our nuclear and particle astrophysics group works with local and international collaborations to probe elusive neutrinos (LENS, MAJORANA, and KATRIN), probe nuclear reactions in stars (xTUNL/LENA), and search for direct evidence of dark matter (DEAP/CLEAN). The results will provide a deeper understanding of stellar evolution, fundamental symmetries, and the role dark matter and neutrinos play in the cosmos.



Theory



How did the Universe begin? What happens when a star comes too close to a black hole? When will the Milky Way run out of gas for star formation? Why is the expansion of the Universe accelerating? You can solve these and other open puzzles in theoretical astrophysics, such as the Galactic matter cycle from stellar birth to galactic winds, the merging of neutron stars, or the formation of planetary systems. Our gravitation and cosmology group explores the extremes of the Universe from the string landscape to dark energy and from relativistic astrophysics to modifications of general relativity. We also develop and use novel computational methods on massively parallel computers such as UNC's premier Killdevil facility to simulate the cosmos.

Life in Chapel Hill



We have an active Graduate Student Association, a full calendar of seminars, and year-round activities. Service opportunities abound with outreach programs to local schools and clubs.

Chapel Hill and neighboring Carrboro form an ideal combination of a college-town atmosphere with urban Raleigh nearby and easy access to beautiful beaches and mountains just a short drive away. Three national research universities and the Research Triangle Park have created a community with one of the highest densities of Ph.D.s in the country. With the lively arts, music and dance community, there is more to do than you can fit into your schedule!

Contact

Application: The deadline for applications is December 15th for full consideration for fellowships, but we will accept late applications until the class is full. For admission, you will need a Bachelor's degree with a minimum GPA of 3.0. We also require both the GRE General Exam and the GRE Physics Exam. The TOEFL exam is required for non-native English speakers.

Apply: <http://gradschool.unc.edu/prospective.html>

Info: <http://physics.unc.edu/>

Phone: 919-962-4703

Mail: Department of Physics and Astronomy
University of North Carolina
Phillips Hall, CB #3255
Chapel Hill, NC 27599-3255



Facilities

Astronomers at UNC have outstanding access to major telescopes in the southern hemisphere including the 4-meter **SOAR Telescope in Chile**, the **PROMPT** and **Skynet telescope arrays**, and the **11-meter SALT telescope in South Africa**.

Two modern remote observing rooms allow students to directly control telescopes around the globe. The **Goodman Laboratory for Astronomical Instrumentation** enables students to build custom, state-of-the-art instruments.

Triangle Universities Nuclear Laboratory (TUNL) is the largest university-based nuclear physics lab in the nation. Our collaborations extend around the globe focusing on solar neutrinos, neutrino properties, the nuclear physics of stars, and searches for dark matter.

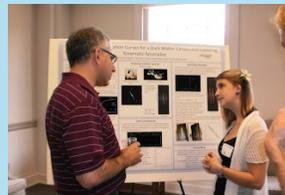
The computational astrophysics group uses UNC's **Killdevil supercomputing cluster**, which has over 10,000 cores, and is currently setting up a high-performance parallel computing resource locally, to which students will have direct access for testing newly developed computational methods.



Courses & Professional Development

Graduate courses in the Department are designed to give a broad foundation and to introduce the student to areas of active research. The first year consists of foundational courses in electromagnetism, classical mechanics, quantum mechanics, and statistical mechanics. Beyond these basics, advanced astrophysics courses will launch you into your research career: stellar structure, galaxy formation and evolution, cosmology, high energy astrophysics, the interstellar medium and star formation, and observational techniques. Graduate students are also trained in teaching, both for their roles as an integral part of the teaching mission of the department and for personal career development.

CAP REU program



Not yet a senior? Join us for the Computational Astronomy and Physics (CAP) REU program to get a taste of the exciting science and fantastic colleagues UNC has to offer.

Every summer we host undergraduates from all over the country in our ten-week program, combining an individual research project with computational skills training and professional development.

CAP-REU website: <http://physics.unc.edu/cap>



Physics and Astronomy University of North Carolina



Join us!

Discover the earliest gamma-ray burst, build and blow up a star, find a new exoplanet, or determine the structure of dark matter in the cosmic web...

In the Department of Physics and Astronomy at the University of North Carolina at Chapel Hill, you will work with world-renowned faculty and outstanding facilities to study exciting areas in astrophysics ranging from stars and black holes to the composition and ultimate fate of the Universe.

You will be welcomed by a group of talented colleagues, joining a vibrant community in class and in the laboratory, all in a beautiful and interesting place to live.

We hope to see you in Chapel Hill!

