

# The Astrophysics Program at South Carolina State University

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## ABSTRACT

The September 2005 issue of "Physics Today" highlighted the progress of developing space science programs at a number of minority institutions. South Carolina State University (SCSU), an Historically Black College/University, was one of the featured schools. Here we present an in-depth review of the astrophysics program at SCSU in the areas of faculty and student research, curriculum development and outreach. We include a discussion of such activities as our Undergraduate Research Institute in Astrophysics, a "pre-REU" summer internship program operating since 1998 in which a total of nearly 50 underrepresented minority students have participated. Successful partnerships with NASA research centers, KPNO, Lawrence Livermore National Lab and others are described as well as our outreach to the K-12 community including the NASA Explorer Schools.

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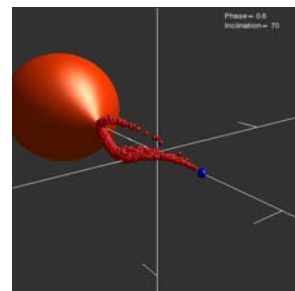
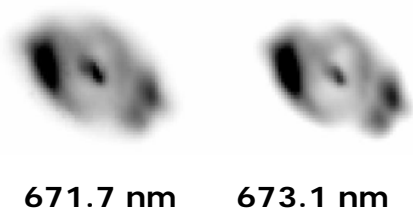
<http://physics.scsu.edu/>

## FACULTY

The astronomy faculty at SCSU has grown from a lone planetarium director in 1994 to currently include two Ph.D. astronomers, a planetarium director and four additional physics and chemistry faculty members involved in student research, curriculum development and outreach in astronomy and astrobiology. Recent work in includes:

- ♦ Narrow-band Imagery with the Robotically Controlled Telescope (Walter, D. K. et. al. 2004)
- ♦ Modeling the accretion stream in polars (Cash, J.L. 2004, 2003)
- ♦ IR spectroscopy of comets (Walter, D.K. in development)
- ♦ Student projects on Large Scale Structure results from the Sloan Digital Sky Survey (Smith, D.M. 2004)
- ♦ 3-D stellar modeling using massively parallel processing (Cash, in development)
- ♦ Student projects in radio astronomy (Payne, J.E., et. al. 2003)
- ♦ Extensive outreach to K-12 community through standards-correlated, inquiry-based workshops and other activities (Walter, D.K., Payne, L.L., & Watts, S. 2004)
- ♦ Member of the Robotically Controlled Telescope (RCT) Consortium

RCT Images of NGC 6543



## STUDENTS

*The Undergraduate Research Institute in Astrophysics (URIA) is a two-tier summer internship program.*

- ♦ Level I is an 8-week summer internship for underrepresented minority students from around the country
- ♦ Level I is a "pre-REU" program held in residence at SCSU from 1998-2005.
- ♦ Level II is for qualified students who spend a second summer in an REU or "REU-like" program working with researchers at
  - Lawrence Livermore National Lab (5 students)
  - Kitt Peak National Observatory (4 students)
  - Goddard Space Flight Center (3 students)
  - Applied Physics Lab (2 students)
  - Planetary Science Institute (1 student)
  - University of South Carolina (1 student)
  - Caltech (1 student)
  - University of Chicago (1 student)

Program	First Time Students	Returning Students	Subtotal
Level I (1998-2005)	48	12	60
Level II (2001-2005)	13	5	18
TOTALS	61	17	78



## OUTREACH



- ♦ Will conduct SOFIA teacher workshop in April 2006
- ♦ Partner at various events with all four of the NASA Explorer Schools in South Carolina
- ♦ Offer teacher courses and workshops on space science each summer 2001-2005
- ♦ Currently helping develop high school iatrochemistry course materials as part of the outreach program of the NASA Goddard Center for Astrobiology.
- ♦ Held teacher videoconference workshop with the NASA MESSENGER Mission E/PO Team in April 2004
- ♦ Use of on-campus planetarium for K-16 and the general public.
- ♦ Held summer space science academy for middle school students each summer 1998-2003
- ♦ Conducted teacher workshops at National Science Teacher Association meeting (2004) and at the annual South Carolina Science Council meetings (2001-2005)

## CURRICULUM

SCSU has institutionalized its commitment to astronomy by implementing the following since 2002

- added a second tenure-track astronomer to the faculty
- created an astronomy minor
- created an astronomy option for physics majors
- created courses in astrophysics, astrobiology & image analysis
- extensively revised existing introductory courses in space science

## REFERENCES

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Walter, D.K. et. al. 2004; "Narrow-band Imagery with the Robotically Controlled Telescope", *Astronomische Nachrichten*, Vol. 325, Issue No 6-8, 656

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## DEMOGRAPHICS OF FIRST TIME STUDENTS

Program	Black Female	Black Male	Hispanic Female	Hispanic Male	White Male
Level 1 (1998-2005)	25	19	1	1	2
Level 2 (2001-2005)	3	7	2	1	