



PHYSICS

DEPARTMENT

65 Tenured/Tenure-Track Faculty

1 Nobel Laureate

3 National Academy of Science

1 American Academy of Arts and Sciences

6 Distinguished Professors

1 Presidential Professor for Teaching Excellence



PHYSICS

DEPARTMENT

2 Chairs endowed at > \$2 million

9 Chairs endowed at > \$1 million

1 Professorship endowed at \$600 K



PHYSICS

DEPARTMENT

5 Women in tenure/tenure track positions

1 Woman Lecturer

3 Hispanic Faculty



PHYSICS

DEPARTMENT

Two New Buildings:

**(1) The George P. and Cynthia W.
Mitchell Institute**

**(2) The George P. Mitchell Physics
Building**

Physics



Physics







PHYSICS

DEPARTMENT

168 Graduate Students

148 Undergraduate Majors

28 Ph.D. Research Staff



**Research efforts extend from
very basic physics to very
applied physics**



5 Main Groups

Theoretical and Experimental

- 1) **Nuclear Physics -- Cyclotron Institute**
- 2) **Condensed Matter/Low Temperature Physics**
- 3) **High Energy Physics**
- 4) **Atomic, Molecular, and Optical Physics /Quantum Optics**
- 5) **Astronomy**



NUCLEAR PHYSICS

10 faculty: 6 Experiment; 4 Theory

One Distinguished Professor

**Most modern and powerful of
DOE funded cyclotrons**



NUCLEAR PHYSICS

- a) **fundamental interaction studies in nuclear beta decay and muon decay**
- b) **nuclear structure (giant resonances)**
- c) **hadron properties in nuclear media**
- d) **relativistic transport theory for heavy ion collisions**
- e) **strongly interacting quantum systems (quark-gluon plasma)**
- f) **relativistic heavy ion collisions**
- g) **lattice gauge theory**



NUCLEAR PHYSICS

**Research collaborations and experiments
at other facilities include:**

**ATLAS (Argonne National Lab),
TRIUMF (Vancouver),
Fermilab (Chicago),
RHIC (Long Island)**



CONDENSED MATTER

LOW TEMPERATURE

18 faculty: 9 Experiment; 9 Theory

One Distinguished Professor

One National Academy of Sciences



CONDENSED MATTER

LOW TEMPERATURE

- a) scanning-tunneling microscopy
- b) spectroscopy of materials
- c) layered compounds
- d) magnetic materials
- e) molecular magnets
- f) nanoscale magnetism
- g) thin magnetic films



CONDENSED MATTER

LOW TEMPERATURE

- h) superfluidity**
- i) superconductivity**
- j) light-matter interactions**
- k) high T_c superconductors**
- l) Bose-Einstein condensation**
- m) mixed ionic-electronic conductors**



HIGH ENERGY
PHYSICS

14 faculty: 7 Experiment; 7 Theory

Two Distinguished Professors

Four Endowed Chairs



HIGH ENERGY
PHYSICS

Mitchell Institute for Fundamental Physics
> \$1 million institute endowment

Cambridge A&M Collaboration – \$500 K
per year for next 10 years



HIGH ENERGY PHYSICS

Research collaborations and experiments at

Fermilab (Chicago)

Soudan (Minnesota)

CERN (Geneva)

Grand Sasso (Italy)



HIGH ENERGY PHYSICS

- a) **CDF at the Tevatron (searches for Higgs boson and supersymmetry)**
- b) **MINOS at Fermilab (neutrino oscillations)**
- c) **underground detector for WIMPs**
- d) **magnetic monopoles**
- e) **cosmic muons**



HIGH ENERGY PHYSICS

- f) supergravity grand unified models
- g) superstring and D-brane models
- h) M-theory
- i) dark matter
- j) modeling of quarks and leptons



AMO PHYSICS/
QUANTUM OPTICS

14 faculty: 7 Experiment; 7 Theory

One Nobel Laureate

Two National Academy of Sciences members

Two Distinguished Professors

Four Endowed Chairs

One Endowed Professorship

Institute for Quantum Studies (IQS)



AMO PHYSICS/ QUANTUM OPTICS

Research collaborations and experiments at

NIST (Boulder)

Princeton

Max-Planck Institute (Munich)

Lawrence Livermore National Lab

Oak Ridge National Lab

CERN (Geneva)

JAERI (Japan)



AMO PHYSICS/ QUANTUM OPTICS

- a) foundations of quantum mechanics
- b) magnetometry
- c) non-linear spectroscopy
- d) ultra-short laser pulse physics
- e) solid state lasers
- f) neutral atom and molecule trapping



AMO PHYSICS/ QUANTUM OPTICS

- g) coherent control of chemical reactions**
- h) coherent control of nuclear transitions**
- i) gamma ray lasers**
- j) quantum computing**
- k) Bose-Einstein condensation**
- l) slow light**



AMO PHYSICS/ QUANTUM OPTICS

- m) lasing without inversion (LWI)**
- n) atomic collision physics**
- o) light scattering from oceans,
atmospheres, and biological systems**
- p) stand-off detection of biological
agents, *e.g.* anthrax**



Astronomy

**First observational astronomer
joined our faculty on March 1, 2006**

7 astronomy faculty

**World class astronomical instrumentation
facility planned in Munnerlyn Building**



Astronomy

Two endowed chairs

1 endowed post-doctoral Fellowship

Annual

George P. Mitchell Public Lecture

in

Astronomy

Texas A&M Physicist Shares in \$500,000 Gruber Cosmology Prize

NEW YORK -- Dr. Nicholas B. Suntzeff, professor of physics at Texas A&M University and a world-renowned expert in supernovae and cosmology, is one of 52 international researchers who will share in the 2007 Gruber Cosmology Prize for their work toward the discovery that the expansion of the Universe is accelerating.

The prestigious prize, valued at \$500,000 and widely acknowledged as second only to the Nobel Prize in terms of importance in the field of cosmology, will be awarded to Saul Perlmutter and Brian Schmidt and their respective teams, the Supernova Cosmology Project and the High-Z Supernova Search Team, for their simultaneous discovery that "has radically changed our perception of cosmic evolution," according to the citation.

Suntzeff co-founded the High-Z Team along with Schmidt in 1994, serving as the principal investigator on the discovery of the supernovae. Prior to that, he co-founded a previous group, the Calan/Tololo Supernova Project, that used the brightness from a specific type of supernova, Type Ia, to produce not only a precise calibration but also a precise measurement of the Hubble constant -- a key finding that paved the way for both teams' subsequent Gruber Prize-winning discovery.

The results from the Calan/Tololo survey and pioneering work on the search for distant supernovae by the Perlmutter group set the stage for the measurement of deceleration -- or, much to their surprise, acceleration.

"Brian and I felt that we could also find these distant supernovae and, using the Calan/Tololo calibrations, measure the deceleration," Suntzeff explains. "We formed the High-Z Team from our mutual collaborators."

Each year the High-Z Team gave its data to different groups at different institutions, ensuring that the highest priority would be given to each part of the problem.

HIGH FLIERS



Dr. Nicholas B. Suntzeff co-founded the High-Z Supernova Search Team recognized along with the Supernova Cosmology Project as co-recipients of the 2007 Gruber Cosmology Prize. The "Z" in High-Z Team is astrophysics shorthand for the amount the Universe has expanded as light travels through space. A large "Z" indicates a great distance, and the High-Z Team has discovered and studied supernovae that exploded more than 5 billion light years from Earth. More information can be found at the [High-Z Team Website](#).
(Information courtesy of William G. Gilroy,



Astronomy

Giant Magellan Telescope (GMT)

Founding partner with:

Carnegie Institute of Washington

Harvard University

Massachusetts Institute of Technology

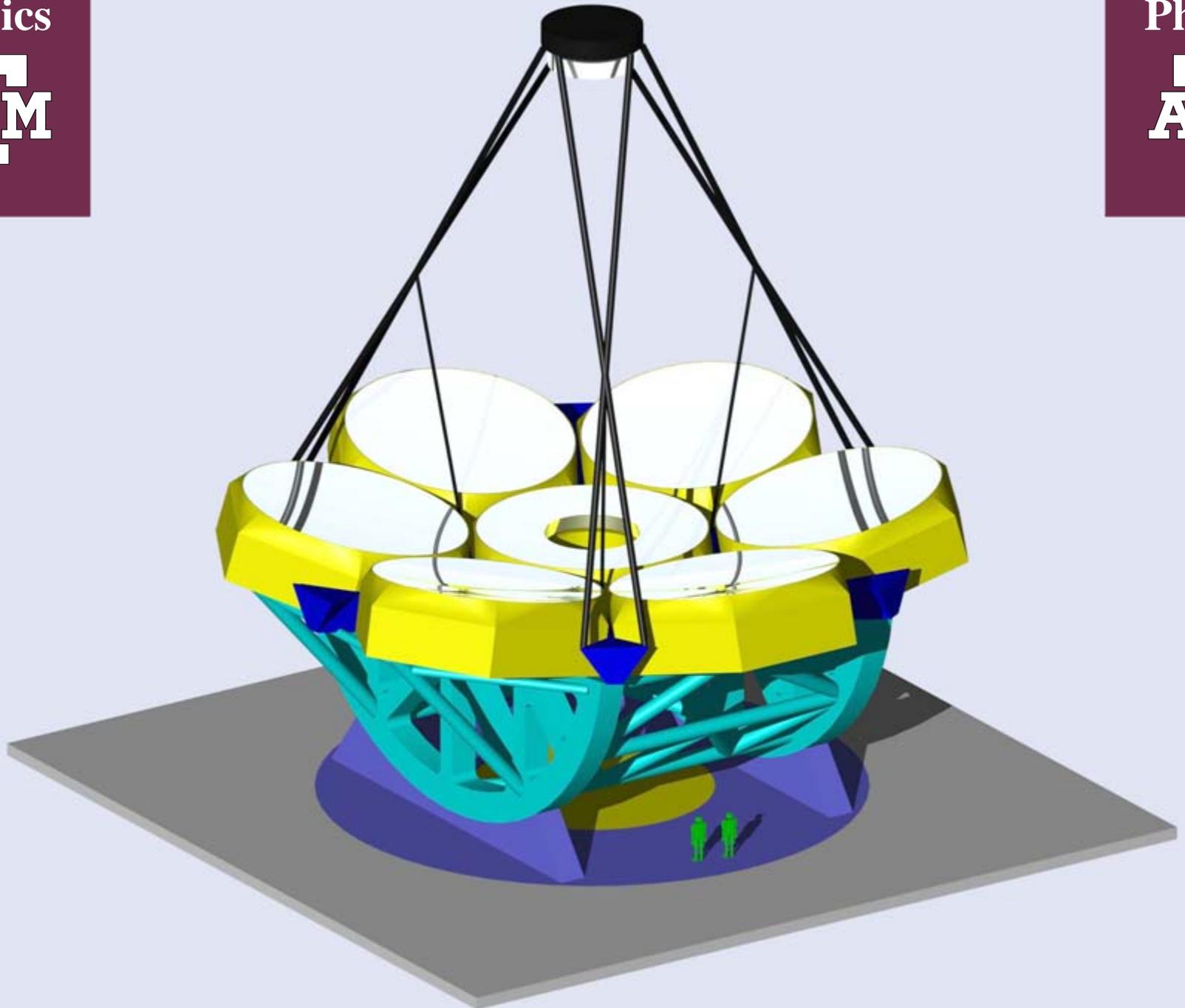
Smithsonian Astrophysical Observatory

University of Arizona

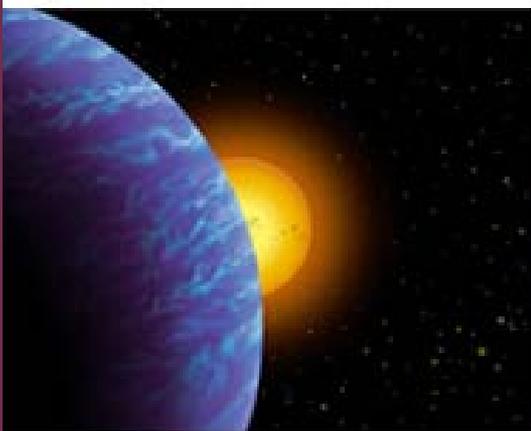
University of Michigan

University of Texas at Austin

Australian National University



Giant Magellan Telescope



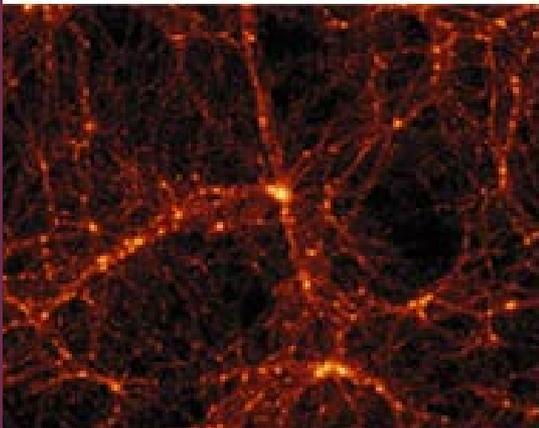
Young Planets



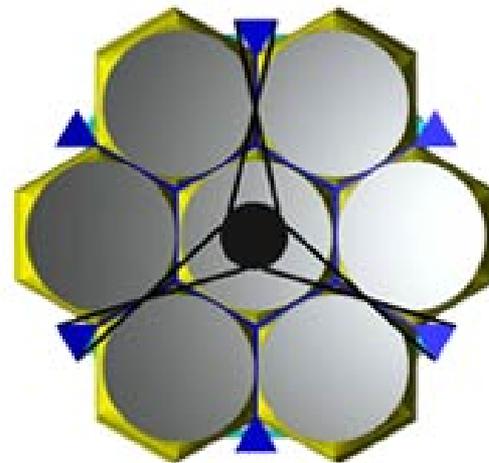
Dark Matter & Dark Energy



Black Holes



The Early Universe



The Future of Discovery

GMT



APPLIED PHYSICS

Faculty from all groups

- a) advanced lithography
- b) anthrax detection
- c) quantum computing
- d) LIDAR mapping of the oceans
- e) laser based sensors
- f) high-field and high-temperature superconductors
- g) biotechnology and biophysics
- h) materials science

'IF WE UNDERSTAND THE UNIVERSE, THEN WE CONTROL IT.'

A BRIEF LESSON ON TIME



Eagle photo/Butch Ireland

Cambridge University professor Stephen Hawking lectures on "Godel and the End of Physics" at Texas A&M on Saturday.

Physicist Hawking wows capacity crowd at Texas A&M



International Conferences

(Quotes)

Adam Riess (Johns Hopkins University) – 2006 Shaw prize in astronomy

“This is the third time I have participated at Texas A&M and each time gets better and better as the department grows. I am really excited to see Texas A&M becoming one of the major centers of thought and practice in cosmology and I look forward to continued participation!”

Gary Steigman (Ohio State University) – Distinguished Professor

“I want to congratulate you and your co-organizers for a very well organized and successful meeting. It was absolutely first class.”

Dragan Huterer (Kavli Institute for Cosmological Physics, University of Chicago)

“That was a wonderful conference, I really enjoyed it!”

Jean-Marie Frere (Université Libre de Bruxelles) – National Coordinator and Chair, Belgian Inter-University Research Program

“thanks A LOT for a beautiful meeting”

D. R. Tovey (Sheffield, UK)

“... it gave me a chance to see the US perspective on the future of our field. It was a pleasure to attend.”



K-12 Outreach, Hands-On Science Activities

(Quotes)

“It has been very influential and positive for her. In fact, after a visit to MIT and Harvard, over the summer, Kristin was asked what she thought of the campuses. She replied, “Well, MIT is nice and all but it is NO Texas A&M.” I thought this response spoke very highly for how well Kristin has been treated and how wonderful you have been to her.”

“... my girls LOVED the refractor glasses! What a fun idea! We have had some great conversations about why they work.”

“Dr. Mitchell, I would like to thank you for setting the lecture up with Dr. Hawking. It was a real treat to see one of the world's greatest physicists at A&M, and I know it wouldn't have happened without you.”

“Even my five year old routinely asks, ‘Is it time for the Physics day yet?’ ”

“The kids are still talking about how much fun they had and how wonderful it was. Once again it was a very wonderful and memorable weekend in College Station.”



K-12 Outreach, Hands-On Science Activities

(Quotes)

“We, too, had an amazing time this weekend. We did not arrive home until 11:00 pm, then sat up for another hour telling Dad all about it! It’s also been the topic of conversation all morning here at work.”

“What a wonderful event! So many activities and opportunities put together in such a professional & well organized manner.”

“Despite being 10 years of age, he is finishing 10th grade and like other soon-to-be juniors, is contemplating where he wants to go to college. His top choices have consistently been Princeton, MIT and Caltech. However, after attending the Physics Festival this past year and learning of the major developments in the Physics and Astronomy Departments, he has added Texas A&M to the list.”

“I have seen the light shine in my son's eyes at these events.”

“We would like to offer our sincerest thanks to both of you and to George Mitchell for the experiences you provided this year . . .”

Physics and Astronomy - The wonder of it all!





THE END