

Derek B. Fox, Assistant Professor

Penn State University Astronomy & Astrophysics

dfox@astro.psu.edu

<http://www.astro.psu.edu/users/dfox/>

525 Davey Laboratory
University Park, PA 16802
(814) 863-4989

543 Longbarn Road
State College, PA 16803
(814) 404-2630

Research Interests

Gamma-ray burst explosion physics, the nature of the short-duration gamma-ray bursts, and the application of gamma-ray burst afterglows to outstanding problems in galaxy formation and cosmology. Separately, the use of white dwarf stars, neutron stars, and black holes as physical laboratories.

Selected Current Projects

- Rapid-Response Afterglow Studies and Software from Penn State, *Swift* Cycle 6
- Identifying the Nearest and Brightest Neutron Stars, *Chandra* Cycle 10
- Redshifts for *GLAST* Gamma-Ray Bursts, *Fermi/GLAST* Cycle 1
- Afterglows and Host Galaxies of Short Gamma-Ray Bursts, *HST* Cycle 15

Faculty

PENNSYLVANIA STATE UNIVERSITY (2005–) University Park, PA
Assistant Professor of Astronomy & Astrophysics

Principal Investigator of the *Hubble Space Telescope* program that solved the 35-year old mystery of the short-hard gamma-ray bursts in October 2005. One of three lead investigators for the Gemini Project to study gamma-ray burst afterglows which discovered GRB 090423 at $z = 8.25$, the most distant object in the Universe.

Postdoctoral

CALTECH (2001–2005) Pasadena, CA
Postdoctoral Scholar & P60 Project Scientist

Project lead and software architect for the robotic Palomar 60-inch telescope, which observes gamma-ray burst afterglows and supernovae on a nightly basis and discovered early optical emission from GRB 040924, GRB 050416, and GRB 050525A. Adapted the robotic Oschin Telescope to fast-response GRB observations, resulting in the discovery of early optical emission from GRB 021004 and GRB 021211, the first such discoveries since January 1999.

Managed the optical and X-ray components of the Caltech afterglow discovery and follow-up program, which led to discovery of the first three afterglows of X-ray flashes (XRFs), and the first XRF redshift, $z = 0.251$ for XRF 020903.

Doctoral

M.I.T. (1993–2000) Cambridge, MA
Ph.D. in Physics, September 2000

Thesis work included X-ray imaging, timing, and spectral analyses of a diverse array of cosmic sources. Thesis advisor: Prof. Walter H. G. Lewin.

Selected Publications

Gamma-Ray Bursts in the *Swift* Era, N. Gehrels, E. Ramirez-Ruiz & D. B. Fox, 2009, *ARA&A*, 47, 567–617

On High-Redshift Gamma-Ray Bursts:

Discovery of Radio Afterglow from the Most Distant Cosmic Explosion, P. Chandra, D. A. Frail, D. B. Fox, & 6 others, *ApJ* submitted, Arxiv.org:0910.4367

A gamma-ray burst at a redshift of $z \sim 8.2$, N. R. Tanvir, D. B. Fox, & 61 others, 2009, *Nature*, 461, 1254–1257

Modeling GRB 050904: Autopsy of a Massive Stellar Explosion at $z = 6.29$, L.-J. Gou, D. B. Fox & P. Mészáros, 2007, *ApJ*, 668, 1083–1102

A photometric redshift of $z = 6.39 \pm 0.12$ for GRB 050904, J. Haislip, M. Nysewander, D. Reichart, A. Levan, N. Tanvir, S. B. Cenko, D. Fox, & 35 others, 2006, *Nature*, 440, 181–183

On Short-Hard Gamma-Ray Bursts:

Hubble Space Telescope Observations of Short Gamma-Ray Burst Host Galaxies: Morphologies, Offsets, and Local Environments, W. Fong, E. Berger, & D. B. Fox, 2010, *ApJ*, 708, 9–25

The Local Rate and the Progenitor Lifetimes of Short-Hard Gamma-Ray Bursts: Synthesis and Predictions for LIGO, E. Nakar, A. Gal-Yam, & D. B. Fox, 2006, *ApJ*, 650, 281–290

The Afterglow and Elliptical Host Galaxy of the Short γ -ray Burst GRB 050724, E. Berger et al., 2005, *Nature*, 438, 988

The Afterglow of GRB 050709 and the Nature of the Short-Hard γ -ray Bursts, D. B. Fox et al., 2005, *Nature*, 437, 845

On Gamma-Ray Burst Early Optical Emission:

Very Early Optical Afterglows of Gamma-Ray Bursts: Evidence for Relative Paucity of Detection, P. W. A. Roming, P. Schady, D. B. Fox, & 37 others, 2006, *ApJ*, 652, 1416–1422

Discovery of Early Optical Emission from GRB 021211, D. W. Fox et al., 2003, *ApJ*, 586, L5

Early Optical Emission from the γ -ray Burst of 4 October 2002, D. W. Fox et al., 2003, *Nature*, 422, 28

On Gamma-Ray Bursts and X-ray Flashes:

A novel explosive process is required for the γ -ray burst GRB 060614, A. Gal-Yam, D. B. Fox, & 24 others, 2006, *Nature*, 444, 1053–1055