

Varun B. Bhalerao

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Education

- Ph.D. (Astrophysics), California Institute of Technology 2006 – 2012
- Thesis: *Characterization of CZT X-ray detectors for NuSTAR, & Masses of Neutron Stars in High Mass X-ray Binaries*
 - Advisors: Fiona Harrison, Shrinivas Kulkarni
- M.S. (Astrophysics), California Institute of Technology 2006 – 2008
- Qualification project: *Dual Channel Photometer for detecting Kuiper belt objects*
- B. Tech. (Electrical Engg.), Indian Institute of Technology, Bombay 2002 – 2006
- GPA: 9.2/10

Research Interests

Instrumentation: X-ray, optical, radio

Science: Neutron stars, pulsars, magnetars, young supernovae, white dwarfs

Publications

Refereed Journals:

- Bailes et al. (2011) “*Stellar metamorphosis: transformation of a star into a planet in a millisecond pulsar binary*”, **Science** submitted
- Bhalerao et al. (2011) “*An optical counterpart to the 2 solar mass pulsar PSR J1614-2230*”, **ApJL** accepted
- Bhalerao & Kulkarni (2010) “*The Polar Cataclysmic Variable 1RXS J173006.4+033813*”, **ApJ**, 721, 412
- Bhalerao & Vahia (2005) “*Mass limit on Nemesis*”, **BASI**, vol. 33, Issue 1, p.27

Conference Proceedings:

- Kitaguchi et al. (2011) “*Spectral calibration and modeling of the NuSTAR CdZnTe pixel detectors*”, UV, X-Ray, and Gamma-Ray Space Instrumentation for Astronomy XVII, **Proc. SPIE**, Vol. 8145
- Kitaguchi et al. (2011) “*Calibration and modeling of the NuSTAR CdZnTe pixel detectors*”, Exploring the X-ray Universe: Suzaku and Beyond
- Harrison et al. (2011): “*NuSTAR: current status*”, **Proc. SPIE** (in prep)
- Mao et al. (2011), “*Evaluation of CdZnTe material for the NuSTAR flight detectors using x-ray diffraction topography*”, **Proc. SPIE** (in prep)
- Harrison et al. (2010) “*The Nuclear Spectroscopic Telescope Array (NuSTAR)*”, Space Telescopes and Instrumentation, **Proc. SPIE**, Vol. 7732
- Bhalerao et al. (2009) “*Observations of Compact Stars and Supernova Remnants with NuSTAR*”, AAS Meeting 213, 452.03; **Bull. AAS**, Vol. 41, p.347

Skills

- Hardware: X-ray detectors, Optical instrumentation, Mechanical design, Hardware – software interfacing, Test setup automation
- Data analysis: Optical and Infrared spectroscopy, Radial velocity measurements, Optical photometry
- Software: IDL, IRAF, Perl, Visual Studio (VB, VC++, C#), Python, HTML

Observing Experience

- Keck I 10-m: 3 nights on Low Resolution Imaging Spectrograph (LRIS)
- Keck II 10-m: 7 nights on Near Infrared Spectrograph (NIRSPEC)
- Palomar 5-m: 9 nights on Double Beam Spectrograph, Large Format Camera
- Robotic Palomar 1.5-m: 50+ hours on GRB-cam

Proposals and Grants

- “*Accurate Neutron Star Masses from HMXBs*” 2009a, 2009b
Instruments: Keck I LRIS, Keck II NIRSPEC, Palomar 5-m DBSP
- “*Broadband Calorimetry of Fermi GRBs*” 2011
Instrument: Fermi GLAST

Teaching Experience

Coursework:

- Recitation instructor, The Evolving Universe – Ay 1 (Caltech) 2007, 2008
- TA, Basic Astronomy and the Galaxy – Ay 20 (Caltech) 2007
- TA, Physics of the Interstellar Medium – Ay 106/126 (Caltech) 2008

Mentoring Experience:

- “Search for counterparts to unidentified ROSAT sources”. Student: Suk Sien Tie 2011
- “Spatial characterization of CZT pixels”. Student: Nancy Wu 2011
- “*StageControl* software for NuSTAR calibration setups”. Student: Pablo Ortiz 2010
- Student facilitator, Indian National Astronomy Olympiad 2001 – 2006

Outreach:

- High school outreach programs, Pasadena schools 2008 – present
- Outreach coordinator for Caltech Astronomy 2007 – present

Awards

- Bhavesh Gandhi Memorial award for Best B Tech Seminar in Electrical Engg, 2005
- Aditya Birla Scholarship (Awarded to top 8 students across all IITs) 2002 – 2006
- National Talent Search Examination (NTSE) Scholarship, 1998 – 1999
- Kishore Vaigyanik Protsahana Yojana fellowship (KVPY), 1998 – 2002
- Institute Technology Citation, IIT Bombay (highest annual award for technical activities) 2006
- International Astronomy Olympiad medals: Gold (2000, 1999), Bronze (1998)

Affiliations

- NuSTAR Instrument and Science teams
- American Astronomical Society

References

Fiona Harrison, Professor of Physics and Astronomy, Space Radiation Lab,
California Institute of Technology
Shri Kulkarni, McArthur Professor of Astronomy and Planetary Sciences,
California Institute of Technology
Marten van Kerkwijk, Professor of Astronomy,
University of Toronto