

Varun Bhalerao

IUCAA, P.O. Bag 4, Ganeshkhind, Pune 411007, India | Ph: +91 (20) 25604 214

<http://www.iucaa.ernet.in/~varunb> | varunb@iucaa.ernet.in

Education and Work

DST INSPIRE Faculty Fellow, IUCAA	2014 – current
Vaidya-Raychaudhuri Postdoctoral Fellow, IUCAA	2012 – current
Ph.D. (Astrophysics), California Institute of Technology	2006 – 2012
<ul style="list-style-type: none">• Thesis: <i>Characterization of CZT X-ray detectors for NuSTAR, & Masses of Neutron Stars in High Mass X-ray Binaries</i>• Advisors: Fiona Harrison, Shrinivas Kulkarni	
M.S. (Astrophysics), California Institute of Technology	2006 – 2008
<ul style="list-style-type: none">• Qualification project: <i>Dual Channel Photometer for detecting Kuiper belt objects</i>	
B. Tech. (Electrical Engg.), Indian Institute of Technology, Bombay	2002 – 2006
<ul style="list-style-type: none">• IIT JEE All India Rank 58	

Research Interests

Instrumentation: X-ray, optical

Science: Compact objects (Neutron stars, pulsars, magnetars, white dwarfs)

Transients (Young explosions, Gravitational wave sources)

Affiliations

- International Science Definition Team for Time Domain Astronomy, Thirty Meter Telescope project (TMT)
- AstroSat CZTI instrument team
- AstroSat science teams: Neutron star binaries, Isolated neutron stars
- NuSTAR Instrument and Science teams
- American Astronomical Society
- Astronomical Society of India

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
- SALT 10-m: 20+ hours (queue mode)

Proposals and Grants

• “The strange companion to the eclipsing millisecond pulsar PSR J1816+4510” Instruments: 1.3m DFOT (ARIES)	2014a
• “Determining the orbit of the gamma ray binary 1FGL J1018.6–5856” Instruments: SALT RSS	2013b
• “Spectroscopic follow-up of young explosions” (Target of Opportunity) Instruments: SALT RSS	2013b
• “Studying High Mass X-ray binaries in Supernova Remnants” Instruments: SALT RSS	2013b
• “Accurate Neutron Star Masses from HMXBs” Instruments: Keck I LRIS, Keck II NIRSPEC, Palomar 5-m DBSP	2009a, 2009b
• “Broadband Calorimetry of Fermi GRBs” Instrument: Fermi GLAST	2011

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: Python, IDL, HEASOFT (ftools, Xspec), IRAF, Perl, Visual Studio (VB, VC++, C#), HTML

Invited talks

- “Following up Electromagnetic counterparts to gravitational wave events from India”, Astronomy, Cosmology & Fundamental Physics with GWs, **Chennai Mathematical Institute**, March , 2015
- “Seeing what we hear: Electromagnetic counterparts to gravitational wave events”, **ASI–2015** transients workshop, Pune, February 2015
- “Observing facilities and time domain activities in India”, International Conference on Computational Physics — Global Observatory Network for Solar System Observations (GONSSO), **Singapore**, January 2015
- “Seeing what we hear: Electromagnetic counterparts to gravitational wave events”, **ARIES**, November 2014
- “The Indian effort for detecting electromagnetic counterparts to gravitational wave events”, **PRL**, April 2014
- “Seeing what we hear: Electromagnetic counterparts to gravitational wave events”, **ASI–2014**, Mohali, March 2014
- “Astrosat – A Multi-wavelength satellite”, Explosive transients in the universe, **Greece**, September 2013
- “Time domain science with Indian telescopes”, **Caltech**, August 2013
- “Building X-ray Telescopes”, **IISc**, April 2013

Publications

- Singer, L. P., Kasliwal, M. M., Cenko, S. B., et al. *The Needle in the 100 deg² Haystack: Uncovering Afterglows of Fermi GRBs with the Palomar Transient Factory*. **ArXiv e-prints**, 2015.
- Tomsick, J. A., Bellm, E., Fuerst, F., et al. *NuSTAR Observations of X-Ray Binaries*. **ArXiv e-prints**, 2015.
- Younes, G., Kouveliotou, C., Grefenstette, B. W., et al. *Simultaneous NuSTAR/Chandra observations of the Bursting Pulsar GRO J1744-28 during its third reactivation*. **ArXiv e-prints**, 2015.
- An, H., Kaspi, V. M., Archibald, R., et al. *NuSTAR results and future plans for magnetar and rotation-powered pulsar observations*. **Astronomische Nachrichten**, 335(3),280, 2014.
- Bellm, E. C., Barrière, N. M., Bhalerao, V., et al. *X-Ray Spectral Components Observed in the Afterglow of GRB 130925A*. **The Astrophysical Journal Letters**, 784,L19, 2014.
- Bhalerao, V., Romano, P., Tomsick, J., et al. *NuSTAR Detection Of A Cyclotron Line In The Supergiant Fast X-ray Transient IGR J17544-2619*. **Monthly Notices of the Royal Astronomical Society**, 447,2274, 2014.
- Kaspi, V. M., Archibald, R. F., Bhalerao, V., et al. *Timing and Flux Evolution of the Galactic Center Magnetar SGR J1745-2900*. **The Astrophysical Journal**, 786,84, 2014.
- Kitaguchi, T., Bhalerao, V., Cook, W. R., et al. *Inflight performance and calibration of the NuSTAR CdZnTe pixel detectors*. In *Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series*, volume 9144 of *Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series*, page 1. 2014.
- Singh, K. P., Tandon, S. N., Agrawal, P. C., et al. *ASTROSAT Mission*. **Proc. SPIE**, 9144,15, 2014.
- Tendulkar, S. P., Fürst, F., Pottschmidt, K., et al. *NuSTAR Discovery of a Cyclotron Line in the Be/X-Ray Binary RX J0520.5-6932 during Outburst*. **The Astrophysical Journal**, 795,154, 2014.
- Harrison, F. A., Craig, W. W., Christensen, F. E., et al. *The Nuclear Spectroscopic Telescope Array (NuSTAR) High-energy X-Ray Mission*. **The Astrophysical Journal**, 770,103, 2013.
- Harrison, F. A. F. A., Craig, W. W. W., Christensen, F. E. F. E., et al. *The Nuclear Spectroscopic Telescope Array (NuSTAR) Mission*. **The Astrophysical Journal**, 770,20, 2013.
- Kaplan, D. L., Bhalerao, V. B., van Kerkwijk, M. H., et al. *A Metal-Rich Low-Gravity Companion to a Massive Millisecond Pulsar*. **The Astrophysical Journal**, 765(2),158, 2013. ISSN 0004-637X.
- Sesar, B., Grillmair, C. J., Cohen, J. G., et al. *Tracing the Orphan Stream to 55 kpc with RR Lyrae Stars*. **The Astrophysical Journal**, 776,26, 2013.
- Bhalerao, V. B., van Kerkwijk, M. H., & Harrison, F. A. *Constraints on the compact object mass in the eclipsing High Mass X-ray binary XMMU J013236.7+303228 in M33*. **The Astrophysical Journal**, 757(1),10, 2012. ISSN 0004-637X.
- Kasliwal, M. M., Kulkarni, S. R., Gal-Yam, A., et al. *Calcium-rich Gap Transients in the Remote Outskirts of Galaxies*. **The Astrophysical Journal**, 755,161, 2012.
- Bailes, M., Bates, S. D. D., Bhalerao, V., et al. *Transformation of a Star into a Planet in a Millisecond Pulsar Binary*. **Science**, 333(August),1, 2011. ISSN 1095-9203.
- Bhalerao, V. B. V. B. & Kulkarni, S. R. R. *The White Dwarf Companion of a 2 Msun Neutron Star*. **The Astrophysical Journal Letters**, 737(1),L1, 2011. ISSN 2041-8205.
- Kitaguchi, T., Grefenstette, B. W., Harrison, F. A., et al. *Spectral calibration and modeling of the NuSTAR CdZnTe pixel detectors*. In O. H. Siegmund, editor, *UV, X-Ray, and Gamma-Ray Space Instrumentation for Astronomy XVII. Edited by Tsakalagos, Loucas. Proceedings of the SPIE, Volume 8145, article id. 814507, 11 pp. (2011).*, pages 814507–814507–11. 2011.

- Bhalerao, V. B. V. B., van Kerkwijk, M. H. M. H., Harrison, F. A. F. A., et al. *The Polar Cataclysmic Variable 1RXS J173006.4+033813*. **The Astrophysical Journal**, 721(1),412, 2010. ISSN 0004-637X.
- Harrison, F. A. F. A., Boggs, S., Christensen, F., et al. *The Nuclear Spectroscopic Telescope Array (NuSTAR)*. In *Space Telescopes and Instrumentation 2010: Ultraviolet to Gamma Ray*. Edited by Arnaud, volume 7732 of *Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series*, pages 77320S–77320S–8. 2010.
- Bhalerao, V. & Vahia, M. N. *Mass limit on Nemesis*. **Bulletin of the Astronomical Society of India**, 33,27, 2005.

Select Non-refereed Publications

- Bhalerao, V., Cenko, S. B., Singer, L. P., et al. *GRB 141124A: iPTF upper limits*. **GRB Coordinates Network**, 17097,1, 2014.
- Bhalerao, V., Paliya, V. S., Anupama, G. C., et al. *GRB 140105A: HCT observations*. **GRB Coordinates Network**, 2014.
- Bhalerao, V. & Sahu, D. K. *GRB 140508A: HCT spectroscopy*. **GRB Coordinates Network**, 16244,1, 2014.
- Bhalerao, V. B., Singer, L. P., Kasliwal, M. M., et al. *Fermi 425193729 / iPTF14cyb: Discovery of optical afterglow*. **GRB Coordinates Network**, 16442,1, 2014.
- Singer, L. P., Bhalerao, V., Kasliwal, M. M., et al. *GRB 140906A: iPTF optical transient candidates*. **GRB Coordinates Network**, 16786,1, 2014.
- Singer, L. P., Bhalerao, V., Kasliwal, M. M., et al. *GRB 140916B: iPTF Optical Observations*. **GRB Coordinates Network**, 16822,1, 2014.
- Singer, L. P., Huang, K. Y., Urata, Y., et al. *GRB 140916B: LOT and iPTF follow-up of optical afterglow candidates*. **GRB Coordinates Network**, 16830,1, 2014.
- Singer, L. P., Kasliwal, M. M., Bhalerao, V. B., et al. *Fermi 425667201: optical counterpart search*. **GRB Coordinates Network**, 16497,1, 2014.
- Singer, L. P., Kasliwal, M. M., Bhalerao, V. B., et al. *GRB 141118A: iPTF Optical Observations*. **GRB Coordinates Network**, 17079,1, 2014.
- Venkataraman, V., Banerjee, D. P. K., Joshi, V., et al. *Near-infrared observations of the supernova in M82 (PSN_J09554214+6940260)*. **The Astronomer's Telegram**, 5793(1), 2014.
- Kaplan, D. L., van Kerkwijk, M., Bhalerao, V., et al. *The Strange Metal-Rich Companion to the Eclipsing Millisecond Pulsar PSR J1816+4510*. In *American Astronomical Society Meeting Abstracts*, volume 221 of *American Astronomical Society Meeting Abstracts*, page #412.05. 2013.
- Miyasaka, H., HongJun, A., Bachetti, M., et al. *Commissioning and In-flight Calibration of the Nuclear Spectroscopic Telescope Array (NuSTAR)*. In *American Astronomical Society Meeting Abstracts*, volume 221 of *American Astronomical Society Meeting Abstracts*, page #244.24. 2013.
- Zoglauer, A., Barriere, N., Bellm, E., et al. *The NuSTAR Supernovae & ToO Program*. In *American Astronomical Society Meeting Abstracts*, volume 221 of *American Astronomical Society Meeting Abstracts*, page #244.11. 2013.
- Bhalerao, V. & NuSTAR Team. *NuSTAR: Unveiling the Hard X-ray Universe*. In *American Astronomical Society Meeting Abstracts #219*, volume 219 of *American Astronomical Society Meeting Abstracts*, page #328.03. 2012.
- Grefenstette, B., Harrison, F. A., Kitaguti, T., et al. *Performance of the NuSTAR Focal Plane Detectors*. In *AAS/High Energy Astrophysics Division*, volume 12 of *AAS/High Energy Astrophysics Division*, page #43.10. 2011.
- Madsen, K., Alexander, D., Bhalerao, V., et al. *Simulating Galactic and Extragalactic Surveys with the NuSTAR Simulator NuSIM*. In *AAS/High Energy Astrophysics Division*, volume 12 of *AAS/High Energy Astrophysics Division*, page #43.08. 2011.
- Zoglauer, A., Kruse-Madsen, K., Kitaguchi, T., et al. *Simulating Extended Galactic Sources with the NuSTAR Simulator NuSIM*. In *AAS/High Energy Astrophysics Division*, volume 12 of *AAS/High Energy Astrophysics Division*, page #43.07. 2011.
- Bhalerao, V., Boggs, S. E., Harrison, F. A., et al. *Observations of Compact Stars and Supernova Remnants with NuSTAR*. In *American Astronomical Society Meeting Abstracts #213*, volume 41 of *Bulletin of the American Astronomical Society*, page #452.03. 2009.
- Quimby, R., Kasliwal, M. M., Nugent, P., et al. *Palomar Transient Factory Discovers a Possible super-Chandrasekhar Type Ia Supernova*. **The Astronomer's Telegram**, 2037,1, 2009.
- Quimby, R., Kasliwal, M. M., Nugent, P., et al. *Supernova 2009dr*. **Central Bureau Electronic Telegrams**, 1783,1, 2009.
- Kasliwal, M. M., Cenko, B., Bhalerao, V., et al. *Discovery of a Luminous Blue Variable Candidate in NGC925*. **The Astronomer's Telegram**, 1347,1, 2008.