

Arnab Dhabal

CONTACT INFORMATION	Department of Astronomy University of Maryland, College Park College Park, MD 20742, USA	<i>Phone:</i> +1-240-351-6961 <i>Email:</i> adhabalastro@gmail.com
EDUCATION	University of Maryland, College Park, MD, USA Ph.D., Astronomy, expected June 2018 Thesis Title: <i>Connecting molecular clouds to clustered star formation using interferometry</i> M.S., Astronomy, December 2014 Thesis Title: <i>Characterization of Optical Elements in BETTII</i> GPA: 3.96/4.00 Indian Institute of Technology Kanpur, India M.Sc., Physics, June 2012 Thesis Title: <i>Reversals in Rayleigh-Benard Convection using temperature correlations</i> GPA: 9.1/10.0	
AWARDS	Ann Wylie Dissertation Fellowship , University of Maryland, College Park Kulkarni Summer Research Fellowship , University of Maryland, College Park MITACS-Globalink Scholarship (Canadian Academic Scholarship) DAAD Scholarship , German Academic Exchange Service Academic Excellence Award by Indian Institute of Technology Kanpur KVPY Fellowship by Department of Science and Technology, Government of India	2017-18 2015 2011 2010 2008 and 2009 2007
RESEARCH EXPERIENCE	BETTII Optics and Interferometry Simulations Advisors: Prof. Lee Mundy at University of Maryland, College Park Dr. Stephen Rinehart at NASA Goddard Space Flight Center <ul style="list-style-type: none">• Optics lead on a balloon-borne far-infrared interferometer mission.• Optics simulations using software packages like FRED and Zemax to determine sensitivities.• Developed and executed alignment procedure using laser trackers and theodolites.• Designed and characterized delay lines used for optical path length control.• Simulated outputs of BETTII to understand instrument sensitivities to physical parameters of young stellar objects like disk mass, envelope mass and inclination angle. Star Formation in Molecular Clouds Advisor: Prof. Lee Mundy at University of Maryland, College Park <ul style="list-style-type: none">• Used CARMA observations of filaments in the Serpens and Perseus molecular clouds to study their morphology and kinematics.• NH₃ mapping using VLA data to connect the large-scale cloud structure to protostars.• Calibration and joint deconvolution of interferometry visibility data along with single dish data to generate data-cubes. Reversals in Rayleigh-Bénard Convection Advisor: Prof. Mahendra K. Verma at Indian Institute of Technology Kanpur <ul style="list-style-type: none">• Set up experimental apparatus for detecting flow reversals for different Rayleigh numbers and cell geometries.• Studied higher Fourier modes of flow and mechanism of flow reversal.	May 2013 – ongoing September 2014 – ongoing Feb 2011 – Apr 2012

ISRO - IIT Kanpur Jugnu Nano-satellite Mission Aug 2008 – Oct 2011
Advisor: Prof. Nalinaksh S. Vyas at Indian Institute of Technology Kanpur

- Subsystem head of the GPS Payload subsystem of a nano-satellite designed at IIT Kanpur, and launched by Indian Space Research Organization on 12th October, 2011.

Detecting Dwarf Galaxies in the near Universe May – Jul 2011
Advisor: Prof. James Taylor at University of Waterloo

- Image processing to search for dwarf galaxies in CFHT (Canada France Hawaii telescope) images, and address the ‘dwarf galaxy problem’.

Negative differential resistance in GaN nanowires Oct 2010 – Feb 2011
Advisor: Dr. S. Dhamodaran at Indian Institute of Technology Kanpur

- Preparation of GaN nanowires, and investigation of their electric properties using focused ion/electron beam (FIB/FEB) deposited platinum contacts.

Molecules in Femtosecond Laser Pulses May – Jul 2010
Advisor: Dr. Robert Moshhammer at Max Planck Institute for Nuclear Physics, Heidelberg

- Developed software for data acquisition from an electron multiplier.

IMU-GPS Integration using Kalman Filtering techniques May – Jul 2009
Advisor: Prof. Allison Kealy at University of Melbourne

- Developed a GUI (graphic user interface) to run, log and visualize data from multiple IMU (Inertial Measurement Unit) and GPS devices simultaneously.

Quantum-well States on Ultra-Thin Films May – Jun 2008
Advisor: Prof. Krishnakumar S. R. Menon at Saha Institute of Nuclear Physics, Kolkata

- Modelling of probability curves and allowed energy states for various configurations of potential wells using ultrathin films.

REFEREED
JOURNAL
PUBLICATIONS

- [6] **A. Dhabal**, L. G. Mundy, M. J. Rizzo, S. Storm and P. Teuben; submitted to *ApJ: Morphology and Kinematics of Filaments in the Serpens and Perseus Molecular Clouds*.
- [5] **A. Dhabal**, S. A. Rinehart, M. J. Rizzo, L. G. Mundy, H. Sampler, R. Juanola-Parramon and 5 co-authors; *JATIS* 3(2), 024002; 2017: *Optics Alignment of a Balloon-borne Far-Infrared Interferometer BETTII*.
- [4] S. Furst, T. Dow, K. Garrard, A. Sohn, D. Fixsen, S. A. Rinehart, E. Mentzell, T. Veach, M. Rizzo, **A. Dhabal**; *JATIS* 2(2), 024001; 2016: *Design and validation of the mounting structure for BETTII balloon-based telescope with thin-walled optics*.
- [3] M. J. Rizzo, L. G. Mundy, **A. Dhabal**, D. J. Fixsen, S. A. Rinehart, D. J. Benford and 4 co-authors; *PASP* 127, 956; 2015: *Double-Fourier interferometers and their spectral sensitivity*.
- [2] S. A. Rinehart, M. J. Rizzo, D. J. Benford, D. J. Fixsen, T. J. Veach, **A. Dhabal** and 13 co-authors; *PASP* 126, 660; 2014: *The Balloon Experimental Twin Telescope for Infrared Interferometry (BETTII): An Experiment for High Angular Resolution in the Far-Infrared*.
- [1] **A. Dhabal**, D. Sathish Chander, J. Ramkumar and S. Dhamodaran; *Micro Nano Lett.* 6, 280; 2011: *Negative differential resistance in isolated GaN nanowires with focused electron beam deposited platinum contacts*.

CONFERENCE
PROCEEDINGS

- [6] **A. Dhabal**, S. A. Rinehart, M. J. Rizzo, L. G. Mundy, D. Fixsen and 8 co-authors; *SPIE*, Volume 9907; 2016: *Optics of Balloon Experimental Twin Telescope for Infrared Interferometry*

(BETTII): delay lines and alignment.

- [5] M. J. Rizzo, S. A. Rinehart, **A. Dhabal** and 16 co-authors; SPIE, Volume 9908; 2016: *The Balloon Experimental Twin Telescope for Infrared Interferometry (BETTII): towards the first flight.*
- [4] S. A. Rinehart and 17 co-authors including **A. Dhabal**; SPIE, Volume 9904; 2016: *The Space High Angular Resolution Probe for the Infrared (SHARP-IR).*
- [3] M. J. Rizzo and 19 co-authors including **A. Dhabal**; SPIE, Volume 9143, 2014: *Building an interferometer at the edge of space: pointing and phase control system for BETTII.*
- [2] S. A. Rinehart and 19 co-authors including **A. Dhabal**; SPIE, Volume 9146, 2014: *The balloon experimental twin telescope for infrared interferometry (BETTII): interferometry at the edge of the atmosphere.*
- [1] T. Veach and 8 co-authors including **A. Dhabal**; SPIE, Volume 9146, 2014: *The balloon experimental twin telescope for infrared interferometry (BETTII): optical design.*

TALKS AND POSTERS	<i>Simulations and Interpretations of BETTII Observations</i> AAS Meeting #229, Dallas, TX	Jan 2017
	<i>Optics of Balloon Experimental Twin Telescope for Infrared Interferometry (BETTII): delay lines and alignment</i> SPIE 9907, Edinburgh, UK	Jul 2016
	<i>Optical Design of a Balloon-borne Interferometer 'BETTII'</i> Scientific Balloon Technical Workshop, Minneapolis, MN	May 2016
	<i>Balloon Experimental Twin Telescope for Infrared Interferometry (BETTII): Optics</i> UMD SPIE OSA Student Chapter, College Park, MD	Apr 2016
	<i>Kinematics of Filaments in Serpens and Perseus</i> AAS Meeting #227, Orlando, FL	Jan 2016
SUCCESSFUL OBSERVING PROPOSALS	Co-Investigator, <i>Testing Filamentary Star Formation using GBT-ARGUS</i> Green Bank Telescope, 18.5 hours	2016
	Co-Investigator, <i>From Dark to Light: Star Clusters in Formation</i> ALMA Cycle 3, 6 hours	2015
TECHNICAL SKILLS	<i>Astronomy Tools:</i> CASA, MIRIAD, SAOImage DS9, IRAF, Source Extractor <i>Data Analysis Softwares:</i> Python, MATLAB, Mathematica, Origin <i>Optics Software and Equipment:</i> OpticStudio Zemax, Photon Engineering FRED, SpatialAnalyzer (metrology software) with Laser trackers and Theodolites <i>Other Engineering Tools:</i> LabVIEW with National Instruments FPGA-based control and data acquisition hardware, Eagle PCB Design <i>Programming Languages:</i> C++, Java, Shell scripting	
OUTREACH ACTIVITIES AND VOLUNTEER WORK	Student Representative of Astronomy Computer Committee, University of Maryland, College Park, 2014-ongoing Master of Ceremonies, University of Maryland Observatory, 2013-2017 Volunteer at PRAYAS, Kanpur, India - Held classes and sessions for teaching under-privileged high school students, 2010-2011	