

CURRICULUM VITAE

NAME: BHARGAV VAIDYA [First Name/Last Name]

PRESENT EDUCATION: PhD Student since August 2008 at the
Max Planck Institute for Astronomy, Heidelberg, Germany

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DATE OF BIRTH: 08 MAY 1985

PUBLICATIONS:

Accretion disks around massive stars: Hydrodynamic structure, stability and dust sublimation

B. Vaidya, C. Fendt, H. Beuther , [2009ApJ...702..567V](#)

PROJECTS:

PhD Project :

I am presently carrying out my PhD research under the kind guidance of **Dr. Christian Fendt** and **Dr. Henrik Beuther**. The title of my thesis is “**Theory of Outflows from Massive Stars**”.

Massive stars play a vital role in order to understand the dynamical evolution of clusters in which they are the major source of heavy elements and UV radiation. During their short life time, they undergo lots of physical processes like winds, photo evaporation , jet like outflows, expanding H II regions and supernova explosions. The outflows from these massive stars are ubiquitous and they are observed for stars having wide range in luminosity and age. There is a very simple and self explanatory picture of evolution of outflows predicted just by observations of large number of massive star forming regions , but the real physical process that is involved is not clear.

- Are these massive jet like outflows magneto centrifugally accelerated from the disc?
- How do the accretion disks behave very close to these massive stars. ?
- What kind of interaction is present between the accretion disc and jet?
- What role does the radiation pressure force play in the dynamics of outflows?

In my thesis I will work on simulating these outflows from massive accretion disc mainly using the conservative code PLUTO and see if physical processes behind the simple outflow evolutionary picture can be understood.

Graduate Project :

The graduate project carried out at the Indian Institute of Technology-Roorkee under the guidance of **Prof. A. K. Jain** was titled “**Gamma Ray Spectroscopy of some N = 78 nuclei**” . The aim of the project was to carry out analysis of two nuclei ^{134}Ba and ^{132}Xe and estimate the levels schemes along with the intensity of the gamma rays. The experiment was carried out at the Gamma Detector Array (GDA) at Inter University Accelerator Center (IUAC), New Delhi. The second part of the project was to check the possible evidence of the E(5) critical point symmetry in the ^{132}Xe nucleus. During the project, I also had an opportunity to set up High Purity Germanium detectors for the Indian National Gamma Array (INGA) project.

Summer Project :

In the Summer Students' Vacation Program, organized by Inter University Center for Astronomy and Astrophysics (IUCAA) at Pune, India, I had an opportunity to work on the project titled ‘**Astrophysical Outflows**’ under the guidance of **Dr. Kandaswamy Subramanian**. During this theoretical project, I learned a lot about the isothermal and adiabatic winds from the Galaxy and also studied about the blast waves along with its Sedov and Taylor self similar solutions. The project was basically to study the effect of the various factors on the Galactic winds in isothermal case. I did many calculations by incorporating the effects of various types of halo potential and finding the critical solution of the winds. I also considered the various forms of mass and energy injections to have the critical solutions. In deriving these critical solutions I had to use the various Hydro-dynamical conservation laws and get to the differential equations involving the Mach number (M). The problem with these second order differential equations was that they were singular at the value $M = 1$, to get rid of this problem I had to develop a program to solve them numerically and then plot the solution using GNUPLOT.

ACADEMIC INFORMATION:

Serial No.	Course	Year of Passing	University/ Institution / Board.	Percentage / CGPA
1.	Masters of Science [M.Sc. Physics] (Semester IV)	2008	Indian Institute of Technology, Roorkee	9.13/10
2	Masters of Science [M.Sc. Physics] (Semester III)	2007	Indian Institute of Technology, Roorkee	9.22/10
3	Masters of Science [M.Sc. Physics] (Semester II)	2007	Indian Institute of Technology, Roorkee	9.25/10
2.	Masters of Science [M.Sc. Physics] (Semester I)	2006	Indian Institute of Technology, Roorkee	9.5/10
3.	Bachelors of Science. (B.Sc.) [Major: Physics] (III year)	2006	University of Mumbai, D.G. Ruparel College	92.62%
4.	Bachelors of Science.(B.Sc.) (II year)	2005	University of Mumbai, D.G. Ruparel College	92.14%
5.	Bachelors of Science.(B.Sc.) (I Year)	2004	University of Mumbai, D.G. Ruparel College	84.71%
6.	Higher Secondary Certificate Exam	2003	Maharashtra State Board Of Secondary Education	85.33%

CURRICULAR ACHIEVEMENTS:**A. Rankings:**

- a. Placed among the National top 1% in the National Graduate Physics Examination (NGPE) in the year 2006 conducted by Indian Association of Physics Teachers (IAPT)
- b. Holder of first merit rank in Mumbai University in the B.Sc. (Physics) in the year 2006.

- c. Also secured second merit rank in Mumbai University in the B.Sc. (Among all the science streams) in the year 2006

B. Awards:

- a. Recipient of the Klaus Tschira Stipendium for carrying out PhD at the Max Planck Institute for Astronomy, Heidelberg and member of the International Max Planck Research school for Astronomy and Cosmic Physics. (IMPRS-HD)
- b. Awarded the Shri. P.R. Thatte Memorial Prize [Cash money and Certificate] for securing the highest marks in Physics in the year 2005 -06 by the D.G Ruparel College
- c. Awarded the Late S.H. Joshi Prize [Cash money and Certificate] for standing first in Physics in the year 2004-05 by the D.G. Ruparel College.

C. Participation:

- a. Attended the conference on “ The Astrophysics of Magneto rotational Instability and related processes” at the Ringberg Castle in April 2009.
- b. Participated in the 39th Saas Fee Advanced Course on 'Magnetic fields from Sun to Compact objects' at Les Diablerets in March 2009.
- c. Successfully completed the course on "Fundamentals of Astronomy and Astrophysics" conducted by The Indian Planetary Society, Mumbai, under the guidance of Dr. J. J. Rawal, in 2004.
- d. Attended the Winter School on “ Astroparticle Physics” conducted by Tata Institute of Fundamental Research (TIFR) in collaboration with Cosmic Ray laboratory (CRL) at Ooty, India

COMPUTER KNOWLEDGE:

Languages Known: C, C++

Application Packages: Matlab, Mathematica, LaTeX

EXTRA CURRICULAR:

- a. Elected as the General Secretary of D.G. Ruparel College for the academic year 2005-06.
- b. Appointed as the Co-convener of the Physics Department during the Technical Festival – COGNIZANCE 2007 at Indian Institute of Technology, Roorkee.