



Ramkrishna Das

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Dr. Ramkrishna Das received his Ph. D. degree from Physical Research Laboratory, Ahmedabad, India in 2010. He is an observational astronomer. He is presently working on observational studies of variable stars and establishment of observational facility of the centre.

Supervision of Research / Students

Ph.D. Students

1. Anindita Mondal (jointly with Dr S Mondal); Multi wavelength studies of Novae; Ongoing.
2. Dhrimadri Khata (co-supervisor, with Dr S Mondal); Understanding Physical Properties of M-Dwarfs; Ongoing
3. Rahul Bandyopadhyaya; Multi wavelength studies of Planetary Nebulae; Ongoing.
4. Ruchi Pandey; Study of dust formation (tentative); Ongoing.

Projects of M.Sc./ M.Tech./ B.Tech./ Post B.Sc. students

1. Ruchi Pandey; SNBNCBS; Photoionization Modeling of nova V1186 Sco; Completed.
2. Robert Wilson Joute; IIT Khargapur; Spectral Classification of Stars; Completed.

Teaching activities at the Centre

1. 3rd Sem (July – Dec, 2016); Advanced Experimental Physics (Astronomy); IPhD; 07

Publications in Journals

1. A. Raj, **R. Das**, F. M. Walter; *Optical and Near-infrared Study of Nova V2676 Oph 2012*; Astrophysical Journal (ApJ); 2017; **835**; 274.

Other Publications

Dutta S., Mondal S., **Das R.**, Joshi S., Jose J., Ghosh S.; "A census of variable stars in the young cluster NGC 2282"; 2016; 41st COSPAR Scientific Assembly, Abstract; 41; 514.

Lectures Delivered

1. Stellar Evolution| SNBNCBS; February; 2017; One.
2. Sky Watching Program (National Science Day); SNBNCBS; Kolkata; February; 2017; One.
3. Sky Watching Program (CK Majumder Memorial Summer Workshop); SNBNCBS; Kolkata; May; 2017; One.

Membership of Committees

Internal Committee

1. Committee to facilitate and initiate the process of land acquisition and construction activities at the proposed site for setting up of astronomical observatory and installation of telescope;
2. Reservation Cell for SCs, STs, Persons With Disabilities and Other Backward Classes;
3. Committee for "Deemed University" status of the centre;
4. Committee for poster preparation;
5. Committee for organizing Bose Fest 2017.

Awards / Recognitions

1. Adjunct faculty in Indian Centre for Space Physics.
2. Invited as reviewer in 'New Astronomy' and 'Research in Astronomy and Astrophysics'.

Sponsored Projects

1. Co-PI of the internal project "Establishment of Astronomical Observing facilities at the Centre and multi-wavelength observations from the National/International telescopes facilities".

Conference / Symposia / Workshops / Seminars etc. organized

1. Member of the organizing committee of Bose Fest 2017 at S N Bose Centre.

Collaborations including publications (Sl. No. of paper/s listed in 'Publications in Journals' jointly published with collaborators)

National

1. A. Raj (Sl. No. 1)

International

1. F. M. Walter (Sl. No. 1)

Significant research output / development during last one year

General research areas and problems worked on

1. Observational studies of novae and variable stars.
2. Planetary Nebulae.
3. Modeling of observed spectra.
4. Telescope project of S N Bose Centre.

Interesting results obtained

During the previous year different kinds of astronomical objects viz. novae, planetary nebulae, star forming regions, late type stars etc. have been observed using the national facilities, e.g., 2m Himalaya Chandra Telescope, 1.3m Devashtal Fast Optics Telescope etc. Part of the observed data has been analyzed, interpreted, modeled where applicable, and results have been published.

We completed photoionization modeling of RS Ophiucus (during the 2006 outburst and quiescence period). The best-fit model parameters are compatible with a hot white dwarf source with black body temperature of $5.5 - 5.8 \times 10^5$ K and roughly constant a luminosity of $6 - 8 \times 10^{36}$ ergs s^{-1} and the ejecta is significantly enhanced, relative to solar, in helium, nitrogen, neon, iron and argon (paper to be submitted soon).

In order to investigate the physical conditions in the nova-shell, we have constructed a comprehensive grid of model atmospheres using the basic parameters spanning over the probable parameter space appropriate for novae, e.g. effective temperatures, luminosities, hydrogen density, inner & outer radii and thickness of the shell. This provides a tool to derive the values of other parameters for a particular nova, by matching the observed values with the calculated ones (paper to be submitted soon).

We have analyzed optical spectrophotometric and near-infrared photometric observations of the nova V2676 Oph. The spectra were dominated by strong H I lines from the Balmer series, Fe II, N I, and [O I] lines in the initial days, typical of a Fe II type nova. The measured FWHM for the H β and H α lines was 800-1200 km s^{-1} . There was pronounced dust formation starting 90 days after the outburst. The J - K color was the largest among recent dust-forming novae (ApJ, 2017, 835, 274)

We are also working on planetary nebulae which have not been studied in details earlier. We already have observed a few of them. Presently, we are analyzing those data and trying to model the spectrum.

Proposed research activities for the coming year

We hope to complete analysis and interpretation of remaining observed data. We plan to observe and study more astronomical objects using the national facilities. In addition, we wish to investigate several problems like understanding the geometry (morphology) and velocity (kinematics) of the material in ejecta of novae, dust formation process in novae, multi wavelength studies of planetary nebulae, evolution of recurrent novae in quiescence phase etc.