

## Chakrabarti Sandip K.

Position: Dean (Academic Programme), Senior Professor and Head,  
Department of Astrophysics and Cosmology,  
S. N. Bose National Centre for Basic Sciences, Kolkata  
and  
In Charge, Academic Affairs, Indian Centre for Space Physics  
Recent period in which ICRA was visited: July 19-29<sup>th</sup>, 2006; Oct. 28-30<sup>th</sup>, 2007; Aug. 29<sup>th</sup>-Sept. 1<sup>st</sup>, 2008, Oct. 2009 [1<sup>st</sup> Xu-Guangqi];  
July 2009 [MG12]; February, 2010 [Nice]; July, 2010 [2<sup>nd</sup> Xu-Guangqi];  
Sept. 2010 [EMJD]



### I Scientific Work

His main research work consists of study of the Astrophysical Flows around black holes. He studies the spectral and temporal properties of black holes, from quasars to nano-quasars. However he is also spending some time on formation and evolution of bio-molecules in star-forming region. He has published about 175 papers in International Refereed journal and a similar number of papers in Proceedings. He has written a book and edited several volumes.

### II Conferences and educational activities

#### *Doctorate Students Supervision*

He has produced 16 Ph. D. scholars and another 8 students are registered for PhD and would submit their thesis soon. Six more students have joined since last year. The students mainly worked on (a) Monte Carlo simulations of spectral and timing properties in presence of jets and outflows; (b) Outbursting black holes; (c) Quasi-periodic Oscillations of several black holes (d) Transonic accretion flows with heating and cooling; (e) Spectral properties of accretion disks having shock waves; (f) Formation of simple bio-molecules during star formation and Grain chemistry using Monte-Carlo simulations etc. (g) Ionospheric change in presence of terrestrial and extra-terrestrial high energy phenomena.

Most of his students have received permanent posts in various national and international institutes (see, bio-data).

#### *Other Teaching Duties*

Generally he takes courses on high energy astrophysics at S.N. Bose Centre and R.K.M. College (autonomous MSc in Astrophysics).

#### *Work With Postdocs*

he has several colleagues including post-docs.

### III Service activities

#### *Within ICRA Net :*

- (a) Participated in the activities of Minsk Conference (April, 2009)
- (b) Participated in the Marcel Grossman Conference (July, 2009)
- (c) Participated in the 1<sup>st</sup> Galileo-Xu-Guanqi conference (October, 2009)
- (d) Contributed in writing Erasmus Mundus joint PhD programme (May, 2009) which was successful. Subsequently, participated ICRA net lecture series in Nice Observatory (Feb. 2010); 2<sup>nd</sup> Galileo-Xu-Guangqi conference in Ventimiglia (July, 2010); EMJD lectures in Univ. of Nice (Sept. 2010).

### 2010 List of Publications

#### *Talks/papers*

January, 2010, *Invited talk on "Importance of Galileo and Darwin today" at IYA programme (400yrs. of Galileo Telescope and 200 years of Darwin's birth)*

February, 2010, *Series of Five talks on "Accretion Process Around Black Holes" at University of Nice (Observatory of Cote Azur), France*

March, 2010, *Invited talk on "Chemical Evolution during Star formation and effects of X-rays and Gamma Rays" at IIT/Roorkee at the Conference on 'Origin of Life'*

March, 2010, *Invited talks on "VLF Research at SNBNCBS and ICSP" at the International Conference on Very Low Frequency Radio Waves: Theory and Observations (VELFRATO-10)*

April, 2010, *Reporting the Status of RT-2 in front of ADCOS Committee*

July, 2010, *'VLF Campaigns in summer, winter and during solar eclipse all over India' at the AOGS conference, Hyderabad, July, 2010*

July, 2010, *Accretion onto outbursting black holes: How do they do it? at the 2nd Galileo-Xu Guanqi meeting at Ventimiglia.*

July, 2010, *Oral presentations of 'RT-2 observations of Solar flares', 'Possible First Evidence of a double gamma ray burst' and poster presentations on 'RT-2 observations of Gamma-Ray Bursts', 'Variability Classes of GRS1915+105: Physical Picture' and 'Evidence of two component accretion flow around the black hole candidate XTE J1550-564 during the outbursts' at 10th COSPAR meeting (17th-25th July) Bremen.*

Sept. 2010, *A Series of 5 lectures to Erasmus Mundus Joint Astronomy Programme Students at the University of Nice.*

October, 2010 *"Accretion processes on Black Holes: the Spectral and temporal properties" at the "Accretion and Outflow in Black Hole Systems" (10-16th October, 2010), Kathmandu, Nepal.*

*Papers in Journals:*

1. S. K. CHAKRABARTI, S. PALIT, D. DEBNATH, A. NANDI, V. YADAV, R. SARKAR, 2009, Fresnel Zone Plate Telescopes for X-ray Imaging I: Experiments with a quasi-parallel beam, *Exp. Astronomy*, 24, 109
2. H. GHOSH, S.K. CHAKRABARTI & P. LAURENT, 2009, Monte-Carlo Simulations of Thermal Comptonization Process in a Two Component Accretion Flow Around a Black Hole, *IJMPD*, 18, 1693
3. S. Das, S.K. Chakrabarti & Mondal, S., 2010 Studies of dissipative standing shock waves around black holes, *MNRAS*, 401, 2053
4. B.G. Dutta & S.K. Chakrabarti, 2010, Evidence for two component flows around the black hole candidate XTE J1550-540 from spectral features during its 1998-1999 outburst, *MNRAS*, 404, 2136
5. S. Palit, S. K. Chakrabarti, D. Debnath, A. R. Rao, A. Nandi, Vipin K. Yadav, V. Girish, 2009, Fresnel Zone Plate Telescopes for X-ray Imaging II: Numerical simulations with parallel and diverging beams, *Exp. Astronomy*, 27, 77
6. H. Ghosh, S. Garain, S.K. Chakrabarti and P. Laurent, 2010, Monte-Carlo Simulations in a Two component Flow in presence of Outflow, *IJMPD*, 19, 607
7. Kinsuk Giri, S. K. Chakrabarti, Madan M. Samanta, Dongsu Ryu, 2009, Hydrodynamic Simulation of Oscillating Shock Waves in a Sub-Keplerian Accretion Flow Around Black Holes, *MNRAS*, 403, 516

8. S. MANDAL & S.K. CHAKRABARTI, 2010, On the Evolution of Accretion Rates in Compact Outburst Sources, *Astrophysical Journal Letters*, 710, 147
9. A.R. RAO, M. HINGER, A. MALKAR, S.K. CHAKRABARTI et al., 2010, RT-2 Detection of Quasi-Periodic Pulsations in the 2009 July 5 Solar Hard X-ray Flare, *Astrophysical Journal*, 714, 1142
10. R. SARKAR & S.K. CHAKRABARTI, 2010, Feasibility of Spectro-Photometry in X-rays (SPHINX) from the Moon, *Exp. Astron.* 28, 61
11. S.K. Chakrabarti, S. Sasmal, S. Chakrabarti, 2009, Ionospheric Anomaly due to Seismic Activities – II: Evidence from D-Layer preparation and disappearance times, *Nat. Haz. Earth. Syst. Sc.* 10, 1751.
12. D. Debnath and S.K. Chakrabarti, 2010, Properties of the Propagating Shock wave in the accretion flow around GX 339-4 in 2010 outburst, *Astron. & Astrophys.* 520, 98

*Edited Volumes:*

S.K. CHAKRABARTI, G.S. Bisnovatyi-Kogan, A.I. Zhuk, (Eds): *Astrophysics and Cosmology After Gamow*, AIP Publication No. 1206 (NY), (2009)

S.K. Chakrabarti: *\bf Propagation Effects of Very ow Frequency Waves*, AIP Publication (NY), No. 1286 (2010)

*Papers in Proceedings:*

1. S.K. Chakrabarti, 2009, Generalized Accretion Flow Configuration: Rationale and Observational Evidences, (Eds.) S.K. Chakrabarti, G.S. Bisnovatyi-Kogan & A.I. Zhuk
2. S.K. CHAKRABARTI, S. PALIT, A. NANDI, V. K. YADAV, D. DEBNATH, 2009, Fresnel Zone Plate Telescopes as high resolution imaging devices, in *Proceedings of International conference on Space Science and Technology*, Thessaloniki, Greece, Eds. G. Lampropoulos and M. Petrou.
3. V.K. YADAV, S.K. CHAKRABARTI, A. NANDI, S. PALIT, 2009, X-ray experiments for Space applications in intermediate energy range in *Proceedings of International conference on Space Science and Technology*, Thessaloniki, Greece, Eds. G. Lampropoulos and M. Petrou.
4. A. NANDI, A.R. RAO, S.K. CHAKRABARTI, J.P. MALKAR, S. SREEKUMAR, D. DEBNATH, M.K.HINGAR, T. KOTOCH, Y. KOTOV, A. ARKHANGELSKIY, 2009, Indian Payloads (RT-2 Experiment) On board CORONAS-PHOTON Mission, in *Proceedings of International conference on Space Science and Technology*, Thessaloniki, Greece, Eds. G. Lampropoulos and M. Petrou.
5. S. K. Chakrabarti, 2010, Black Hole Astrophysics in 'The Sun, Stars, The Universe and General Relativity', proceedings in Memory of Y. Zeldovich, held in Minsk (April 2009), p. 41-50, Ed. R. Ruffini and G. Vereschagin
6. S. K. Chakrabarti and S. Chakrabarti, 2010, Evolution of Pre-biotic molecules during star formation in 'The Sun, Starrs, The Universe and General Relativity', proceedings in Memory of Y. Zeldovich, held in Minsk (April 2009), p. 51-58, Ed. R. Ruffini and G. Vereschagin
7. S. K. Chakrabarti *Fundamental Concepts in Transonic Flow Paradigm of Black Hole Astrophysics*, 2010, *Proceedings of 1st Galileo-Xu-Guangqi conference in Shanghai*, Oct. 2009

8. Chakrabarti Sandip K., Sasmal S., Pal S., Mondal S. K., Results of VLF campaigns in Summer, Winter and during Solar Eclipse in Indian Subcontinent and Beyond, AIP Conf. Proc. 1286, 61 (2010)
  9. Pal Sujay, Chakrabarti S. K. Theoretical models for Computing VLF wave amplitude and phase and their applications AIP Conf. Proc. 1286, 42 (2010)
  10. Bhowmick D., Chakrabarti S. K., Sasmal S., Mondal S. K. Studies of VLF Signals using Balloon Borne and Undersea Antennas, AIP Conf. Proc. 1286, 345 (2010)
  11. Kotoch T. B., Chakrabarti Sandip K., Nandi A., Debnath D., Mondal S. K. Gamma-Ray Bursts from RT-2 payloads and VLF signals AIP Conf. Proc. 1286, 339 (2010)
  12. Mondal S. K., Chakrabarti S. K. Earth's Ionosphere as a Gigantic Detector of Extra-terrestrial Energetic Phenomena: A Review, AIP Conf. Proc. 1286, 311 (2010)
  13. Ray Suman, Chakrabarti S. K., Sasmal S., Choudhury A. K. Correlations between the Anomalous Behaviour of the Ionosphere and the Seismic Events for VTX-MALDA VLF Propagation AIP Conf. Proc. 1286, 298 (2010)
  14. Sasmal S., Chakrabarti S. K., Chakrabarti S. Studies of the Correlation Between Ionospheric Anomalies and Seismic Activities in the Indian Subcontinent AIP Conf. Proc. 1286, 270 (2010)
- Maji Surya K., Chakrabarti Sandip K., Mondal Sushanta K. Partial Effects on VLF Data due to a Solar Flare During 2010 Annular Solar Eclipse AIP Conf. Proc. 1286, 214 (2010)
15. Nandi Anuj, Chakrabarti Sandip K., Debnath Dipak, Kotoch Tilak B., Rao A. R., Mondal S. K., Maji S., Sasmal S. Simultaneous observation of Solar Events by Indian Payload (RT-2) and ICSP-VLF receiver, AIP Conf. Proc. 1286, 200 (2010)
  16. Basak Tamal, Chakrabarti S. K., Pal S. Global effects on Ionospheric Weather over the Indian subcontinent at Sunrise and Sunset AIP Conf. Proc. 1286, 137 (2010)