

# Institute Lecture

## MOM and SARA: Mars and Moon

**Dr. Anil Bhardwaj, FNA, FASc, FNASc**



Director, Space Physics Laboratory, Vikram Sarabhai Space Centre, Trivandrum

7<sup>th</sup> November 2016, Time: 5.30 PM, Venue: L - 6

### Abstract

I will talk about the Indian Mars Orbiter Mission (MOM), its challenges for project, mission and launch vehicle, new technological requirements, mission constraints, strict timeline, and technological and scientific objective, and results. In the latter half of the talk I would describe how the new observations by the SARA (Sub-keV Atom Reflecting Analyzer) experiment on the Chandrayaan-1 mission have totally changed our understanding on the interaction of solar wind with the Moon. The talk ends with a perspective on future planetary missions of India.

### About the speaker

Dr. Anil Bhardwaj received his M.Sc. from Lucknow University (1987) and Ph.D. from the Indian Institute of Technology, Banaras Hindu University (1992). He joined ISRO in 1993 as a scientist at the Space Physics Laboratory of the Vikram Sarabhai Space Centre in Trivandrum. Currently, he is the Director of Space Physics Laboratory (SPL) of ISRO. He has worked at NASA Marshall Space Flight Centre, USA, for ~2 years as NRC Senior Research Associate during 2004-2005.

Dr. Bhardwaj initiated the research in planetary sciences at SPL and has contributed to the development of planetary science activities and planning of planetary missions of India. He was the Principal Investigator (PI) of SARA experiment on the first Indian Lunar mission Chandrayaan-1, which has revolutionized our understanding on the interaction of solar wind with the Moon through several new findings. He is the PI of MENCA experiment on the Indian Mars Orbiter Mission (MOM). He and his team have PI-lead experiments on Chandrayaan-2 Orbiter and Lander missions as well as Aditya-L1 mission. He has been an observer on Chandra and XMM-Newton X-ray Observatories of NASA and European Space Agency, Hubble Space Telescope, and Giant Meterwave Radio Telescope (GMRT) of India.

His research field is planetary and space sciences. He has also made several contributions in the field of solar system X-ray astronomy, including discovery of X-rays from the rings of Saturn and X-ray flares from Jupiter and Saturn, and theoretical modelling. His research findings have led to several Press Releases by NASA and European Space Agency, Cover pages of American and European journals, and American Geophysical Union Journal Highlights.

Dr. Bhardwaj has over 120 refereed publications and seven chapters in books including a Chapter in the “Encyclopedia of the Solar System”. He was the Editor-in-Chief of Advances in Geosciences (Planetary Sciences) during 2005-2011, and on Editorial Board of Planetary and Space Science (Elsevier). Currently he is a member of Editorial Board of Space Science Reviews (Springer), Molecular Astrophysics (Elsevier), and Current Science, and is Associate Editor of Advances in Space Research (Elsevier). He is a member of several ISRO, national and international committees on planetary sciences.

Dr. Bhardwaj has received many awards and honours, including Shanti Swarup Bhatnagar Prize (2007), Nehru Centenary Lecture of Kerala Academy of Sciences (2007), ISRO Team Achievement Award for the Chandrayaan-1 (2008), Indo-Swedish Project Award from Swedish Research Council (2010), Indo-Swiss Joint Research Programme (ISJRP) Fellowship (2010), ISRO Merit Award (2012), Planetary Science Distinguish Lecture of AOGS, Japan (2014), Dr. P. R. Pisharoty Memorial Lecture of the Kerala Science Congress (2015), Distinguished Alumnus Award from Indian Institute of Technology (IIT) in 2015, and INSA-Vainu Bappu Memorial award (2016). He is an elected Fellow of Indian National Science Academy, Indian Academy of Sciences, National Academy of Sciences India, as well as of Kerala Academy of Sciences, and Indian Geophysical Union. He is also an elected member of the International Academy of Astronautics and International Astronomical Union. He was elected President of Asia Oceania Geosciences Society (AOGS) Planetary Science for 2006-2010 and is currently the Vice-Chair of COSPAR Commission B.

Dr. Bhardwaj has supervised Ph.Ds as well as M.Tech., M.Phil. students, and provided guidance to M.Sc. and Academy Summer Research students.

Tea at 5.15 PM

All interested are welcome.

Amalendu Chandra

Dean of Research and Development, IIT Kanpur