

# 7<sup>th</sup> C. K. Majumdar Memorial Lecture

4<sup>th</sup> January 2008, at 3.30 PM

## Venue

**Purbashree**  
Bharatiyam Cultural Multiplex  
Eastern Zonal Cultural Centre  
IB-201, Salt Lake, Kolkata

The C K Majumdar Memorial Lectures are organized by the Satyendra Nath Bose National Centre for Basic Sciences, Kolkata as a tribute to the late Professor Chanchal Kumar Majumdar, Founder-Director of the Centre.

## Speaker

**Professor R Ramesh**

on

## WHITHER OXIDE ELECTRONICS ?

### About the Speaker



#### Professor R Ramesh

Department of Materials Science & Engineering and  
Department of Physics, Materials Sciences Division  
Lawrence Berkeley Laboratory  
University of California, Berkeley, USA

#### EDUCATION

1983-1987

M.S, Ph.D. in Materials Science , University of California, Berkeley

#### POSITIONS HELD

Jan. 2004-present

Professor, University of California, Berkeley

Jan. 1989- Jan. 1995

Member of Technical Staff, Bell Communications Research, Red Bank

Jan. 1995 - Aug. 1999

Associate Professor, University of Maryland, College Park

Aug. 1999 - Dec. 2003

Professor, Distinguished University Professor, University of Maryland, College Park

#### RESEARCH INTERESTS

- Thin film growth and materials physics of complex oxides.
- Oxide thin film heterostructures.
- Nanoscale Characterization.
- Materials Processing for Devices.
- Information Technologies.

#### ACADEMIC HONORS AND PROFESSIONAL AWARDS

Fellow, American Physical Society, 2001; Alexander von Humboldt Senior Scientist Prize, 2001; 2005 David Adler Lectureship Award of the American Physical Society.

#### PUBLICATIONS, TALKS AND PATENTS

Over 250 papers, reviews and monographs covering magnetic materials, high temperature superconductors, ferroelectrics, semiconductor heterostructures etc. Over 8000 citations that place him in the top-300 among approximately 270,000 worldwide. 16 Patents issued and 11 filed.

#### SUMMARY OF KEY RESEARCH ACCOMPLISHMENTS

Professor Ramesh's work over the past 10+ years has spanned a broad range of novel metal oxide materials, with a specific focus on the Science and Technology of functional multicomponent perovskites. He has made numerous pioneering contributions pertaining to thin film growth by pulsed laser deposition, creation of novel device structures and their characterization using advanced probes.



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**Kolkata**

## ABSTRACT

Complex oxides exhibit a rich spectrum of functional responses, including magnetism, ferroelectricity, highly correlated electron behaviour, superconductivity, etc. The basic physics of such materials provide the ideal playground for interdisciplinary scientific exploration. The advent of high temperature superconductivity in the cuprates, ushered in a new era of scientific and technological exploration of these fascinating materials. Over the past two decades, I have had the fortune of being able to work in this field, learning and exploring with my colleagues, students and postdocs. Our work would not have been possible without the continuous support of various federal agencies, including, DOE, NSF, DARPA, ONR, ARO and AFOSR as well as several industrial sources. Together we are exploring the science of such materials (for example, ferroelectricity, colossal magnetoresistance, multiferroicity, etc) and their applications in thin film form by creating model epitaxial heterostructures and nanostructures. Specifically, we are studying the role of thin film growth, heteroepitaxy and processing on physical and functional properties. A new development has been the discovery of the formation of spontaneously assembled nanostructures that exhibit 3-D heteroepitaxy. In this talk I will describe our scientific and technological successes and lessons learned with examples assembled from many areas of oxide electronics and will finish the presentation with some closing thoughts on where we are heading in the years to come.

