



## Materials under Extreme Conditions – Enabling Technologies and Applications 26-30, December 2016

Organized by  
Centre for High Pressure Research  
Bharathidasan University, Tiruchirappalli,  
Tamilnadu, India-60 024, [www.bdu.ac.in](http://www.bdu.ac.in)



Bharathidasan University was established on February 1982, and was named after the great revolutionary Tamil poet, Bharathidasan (1891-1968). The motto of the University "We will create a brave new world", has framed from Bharathidasan's poetic words, "Pudhiyathor Ulagam Seivom".

### THE CENTRE

The centre is first of its kind in India for high pressure research equipped with high tech facilities and it was inaugurated by Prof. T. Ramaswamy, Former Secretary, DST, New Delhi. The major focus of CHPR is to explore a wide research in condensed matter physics and to investigate various materials such as Manganites, High temperature and Fe-based superconductors, DMS materials, Organic conductors, MCE materials, Heavy fermions, Spin ladders, Dirac metals, Chalcogenides, and Topological insulators etc., under extreme conditions of High Pressure (50 GPa), Low Temperature (1.9 K) and High Magnetic Field (9 T).

### Course Registration Fee

Participants from India:  
Faculties / Scientists/Students: Rs.2,000/-  
Industry / Research Organizations: Rs. 5,000/-  
SAARC Countries: US\$ 100  
Non-SAARC Countries: US\$ 400  
Registration Open : 01/08/2016

Registration fee includes course materials and lunch only. Accommodation based on payment basis in the BDU guest house (Limited seats) and hotels.

Last date of application receiving for registration from along with DD : 01/12/2016

### THE COURSE

To provide undergraduate and graduate students in the science and engineering fields and an overview of emerging enabling technologies that will accelerate the pace of discovery in high pressure studies on materials as well as lead to synthesis of novel materials.

This series of lectures will cover recent developments in static high pressure and synthetic diamond field that allows for collection of structural, transport and magnetic properties data with unprecedented sensitivity on materials under extreme conditions. These advances are nicely complemented by advances in diagnostic techniques including facilities of synchrotron X-Ray sources and spallation neutron sources. The specific examples will be covered from a diverse range of materials including transition metals, rare earth metals and alloys as well as iron-based superconducting materials.

### THE FACULTY

Dr. Yogesh Vohra is a Professor and University Scholar in the Department of Physics at the University of Alabama at Birmingham (UAB), USA. He is the founding director of the UAB Center for Nanoscale Materials and Biointegration. He has over three hundred publications in physics and materials science and holds several patents in synthetic diamond technology. His long-term research interests are in structural phase transformations, electrical and magnetic properties of materials under extreme conditions.



### The Course Coordinator

Prof. S. Arumugam is a Coordinator of Centre for High Pressure Research (CHPR), School of Physics, Bharathidasan University. He has more than 25 years of experience in the field of high pressure low temperature physics and high pressure instrumentation such as Uniaxial Pressure Device for Electrical Resistivity & AC Susceptibility measurements, DC SQUID Vibrating Coil Magnetometer, Diamond Anvil Cell, Hydrostatic & Quasi Hydrostatic Pressure Cells, Modified Bridgman Anvil Pressure Cell. He had investigated various strongly correlated systems at extreme conditions. As a Scientist, he had visited many countries such as Swiss, Japan, Germany, Italy, France, South Korea, Sweden, USA and Russia.



### Further details. Please contact Course Coordinator:

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### 26/12/2016

09.30 - 10.30 AM Introduction to mechanical properties of diamond for ultra high pressure generation  
10.45 - 11.45 AM The limiting pressure in beveled diamond anvils and the birth of two-stage nanocrystalline diamond micro anvils (DAC)  
12.00 - 02.00 PM Lunch Break  
02.00 - 04.30 PM Problem solving session with examples

### 27/12/2016

09.30 - 10.30 AM Growth of Single Crystal Diamond by Chemical Vapor Deposition – Fabrication of Designer Diamonds  
10.45 - 11.45 AM Application of Designer Diamonds in High Pressure Studies on Materials  
12.00 - 02.00 PM Lunch Break  
02.00 - 04.30 PM Problem solving session with examples

### 28/12/2016

09.30 - 10.30 AM Growth of Nanocrystalline Diamond by Chemical Vapor Deposition  
10.45 - 11.45 AM Fabrication of Two-stage Nanocrystalline Diamond Micro-anvils by Chemical Vapor Deposition and High Pressure Results  
12.00 - 02.00 PM Lunch Break  
02.00 - 04.30 PM Problem solving session with examples

### 29/12/2016

09.30 - 10.30 AM Metals under Extreme Conditions – Crystal Structures and Equation of States  
10.45 - 11.45 AM Iron-based Superconductors under High Pressures  
12.00 - 02.00 PM Lunch Break  
02.00 - 04.30 PM Problem solving session with examples

### 30/12/2016

09.30 - 10.30 AM 4-f Rare Earth Metals under Extreme Conditions – Crystal Structures and Equation of States  
10.45 - 11.45 AM 4-f Rare Earth Metals under Extreme Conditions – Magnetic Properties and 4f-shell Delocalization  
12.00 - 02.00 PM Lunch Break  
02.00 - 04.30 PM Final Examination for students

### How to apply?

The workshop is aimed for *maximum of 60 participants* who may be **young researchers (M.Sc./ M.Phil/ Ph.D students/ young Teaching faculty at college level any where from India and abroad)**. The fee will be accepted in the form of demand draft (DD) in favour of **The Course Coordinator, CHPR-GIAN programme, Bharathidasan University, Tiruchirappalli**, payable at Tiruchirappalli. DD shall be sent to:

**Prof. S. Arumugam, Coordinator, Centre for High Pressure Research, School of Physics, Bharathidasan University Tiruchirappalli-620 024, Tamil Nadu, India**

**Confirmation of registration will be communicated to the participants by email on 01/12/2016. Spot registration will not be accepted.**