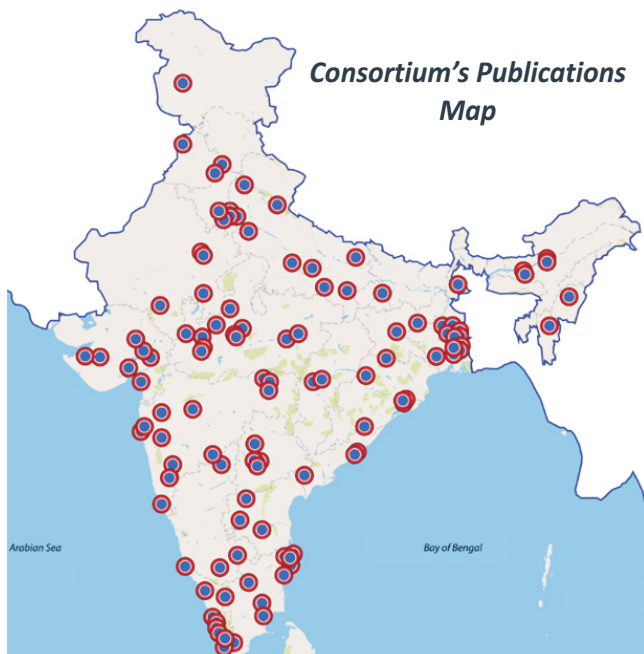
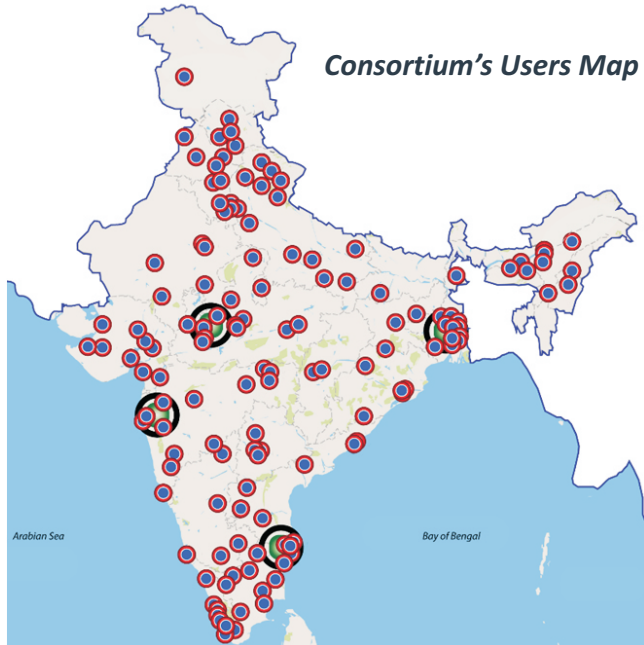


Presence Across the Nation

Serving about **14000** scientific users from **350 Universities and Academic Institutions**, Consortium published about **4150** research papers with mean impact factor exceeding **2.5**.



UGC-DAE Consortium for Scientific Research

Indore · Kolkata · Mumbai · Kalpakkam

www.csr.res.in



विश्वविद्यालय अनुदान आयोग - परमाणु ऊर्जा विभाग
वैज्ञानिक अनुसंधान संकुल, इन्दौर

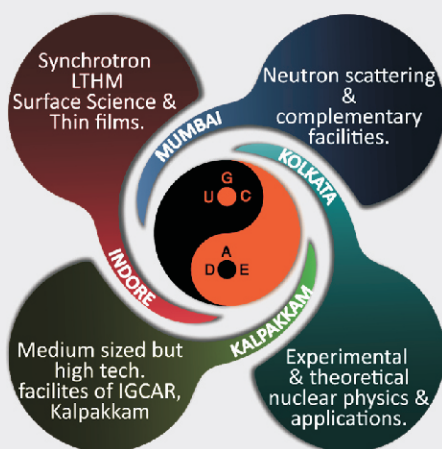


**UGC-DAE Consortium for Scientific
Research, Indore**

Facilities and Research Program of Consortium in a Nutshell

UGC-DAE Consortium for Scientific Research (formerly known as IUC-DAEF & hereinafter called '**Consortium**'), is an **Inter-University Centre of UGC** serving the nation since 1990.

Consortium provides access and support to Universities and Academic Institutions to state of art research facilities through its Centres at Indore, Kolkata, Mumbai and Kalpakkam node.



Indore Centre provides support for beamlines at synchrotron radiations sources (Indus-1 & Indus-2); Materials under extreme condition – Low Temperature and High Magnetic Field (LTHM), Surface Science & Thin Films, Spatial/Spectral & Time Resolved imaging for materials & dynamics.

Kolkata Centre provides support for experimental and theoretical nuclear physics & applications of nuclear techniques using DAE accelerators at VECC – Kolkata, IOP Bhubaneswar & TIFR-BARC Mumbai.

Mumbai Centre provides support for Neutron Scattering Facilities at Dhruva Reactor at BARC and complementary facilities.

Kalpakkam Node provides accesses to the medium size but high technology facility of IGCAR, Kalpakkam.

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New Initiatives

To make materials research more relevant to society, Consortium has taken some new initiatives. Thematic workshops on "Materials Research for Societal Relevance" & "Techniques & Instrumentation for Materials Research" were organized in May and August 2017. CRS projects on these themes were invited and received a great response.

Driving Materials Science Research for Societal Relevance

Materials science provides a platform to address emerging societal issues such as accessible clean water, economical and eco-friendly energy converters, energy saving and storage devices, capturing CO₂, fuel cell, eco friendly materials for civil structures, bio-materials etc. The need of the hour is to emphasize on development of materials with properties and performance superior to today's materials and to develop novel technologies meeting the societal needs in an eco-friendly and economical way. To meet these challenges, Consortium organized 2 day's workshop at SP University, Pune during May 25-26, 2017. With 150 participants, 38 CRS projects were presented in this workshop.

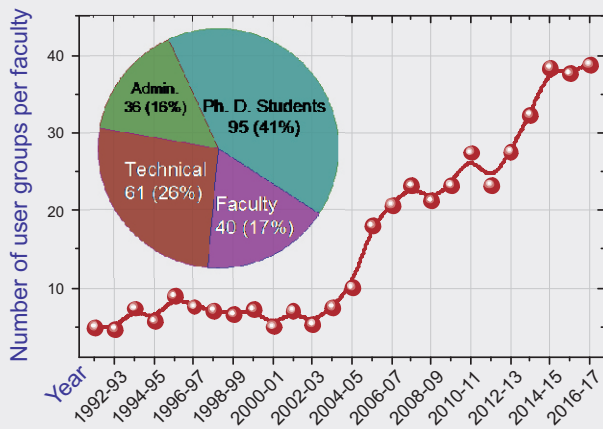


Revisiting Techniques & Instrumentation

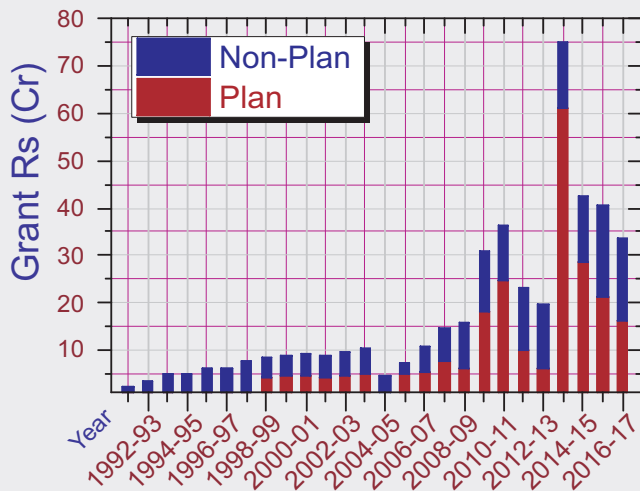
Instrumentation development in Materials Science Research requires focused attention in our country. To emphasize upon this, Consortium organized 2 day's workshop on 'Techniques & Instrumentation for Materials Research (TIMR)' at Devi Ahilya University in Indore during August 21-22, 2017. In this workshop, on-going research & developmental efforts in instrumentation across the country were highlighted and new CRS projects were invited. Workshop got overwhelming response with about 250 participants. 20 invited talks and 16 CRS projects were presented in 2 days' workshop.



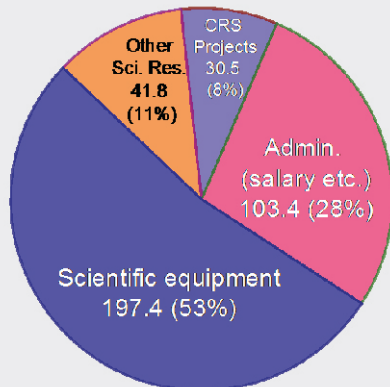
Consortium's Manpower Strength & CRS User Support



Financial Outlay for Consortium



Expenditure during last 10 years



In last 10 years Consortium received total grant of Rs. 373 Cr., 72% of that was spent for scientific work and rest on administrative, including salary etc. About Rs. 200 Cr were spent on equipments and shared by about 12,000 users.

10

Key Research Areas

LSF - Large scale facilities, Consortium provides access to LSF established by DAE-synchrotron radiation sources, RRCAT Indore; Neutron scattering, Dhruva reactor BARC, Mumbai & Accelerator based experiments using VECC, Kolkata. Also synthesis of thin film, surface science, single crystal, bulk samples is included here.

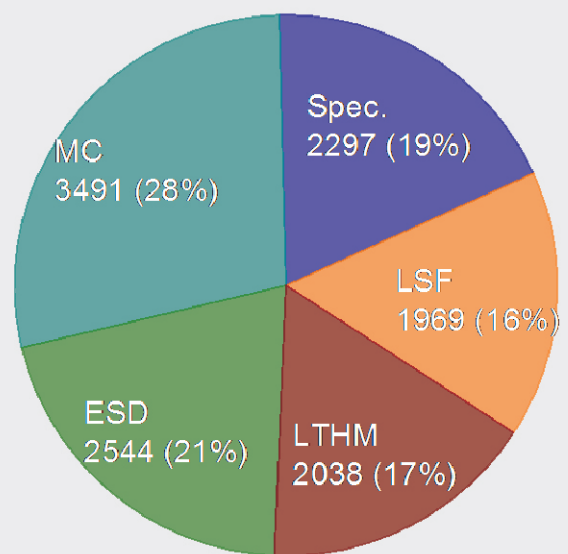
LTHM - Low Temperature High Magnetic Field & Cryogenics facilities form a cluster of several high end facilities – some of which are unique in country. PPMS, VSM, LTHM- Mössbauer, MOKE, XRD, Heat Capacity, Resistivity, Magnetoresistance, Thermopower, Low Temperature measurements and liquid nitrogen and liquid helium production facilities are among the most prolific used facilities.

ESD - Electron spectroscopy and diffraction methods e.g. XRD/XRR and XPS provide the information about electronic and physical structures at atomic length scales.

MC - Material characterization facilities are used in physics, chemistry, material science, engineering science, biological sciences and earth science: AFM/SPM, SEM-EDAX, FESEM, TEM, Zeta Potential, MOKE, DSC, DLS, Dielectric Permittivity, P-E Loop, Impedance Analyzer, ED-XRF, Fluorescence Microscope etc.

Spec. - Spectroscopy techniques like Molecular Spectroscopy, Secondary Ion Mass Spectroscopy, Mössbauer Spectroscopy, Raman Spectroscopy, Ultra-Violet Visible Spectroscopy, Fourier Transform Infra Red Spectroscopy etc.

Distribution of users in key Research Areas



3

Beam Line Setups Established by Consortium at the DAE Large Scale Facilities

AIPES Beamline at Indus-1

Angle integrated photo emission (AIPES) beamline was developed by Consortium in the year 2000. The beamline has a very high utilization which is reflected in publications appeared in high-impact factor journals. Resonant Photoemission spectroscopy (RPES) is a unique feature on this which has inspired several groups in the country to work in this area.

Soft XAS Beamline at Indus-2

Soft x-ray absorption spectroscopy (XAS) beamline was developed by Consortium (with initial DST support). This 35 meter long UHV beamline became operational in May 2013. Within a short span of time, this beamline has been used by more than 150 users and about 40 publications. In-situ thin film growth and XAS measurements in ultra-thin films have been recently tested on this beamline.



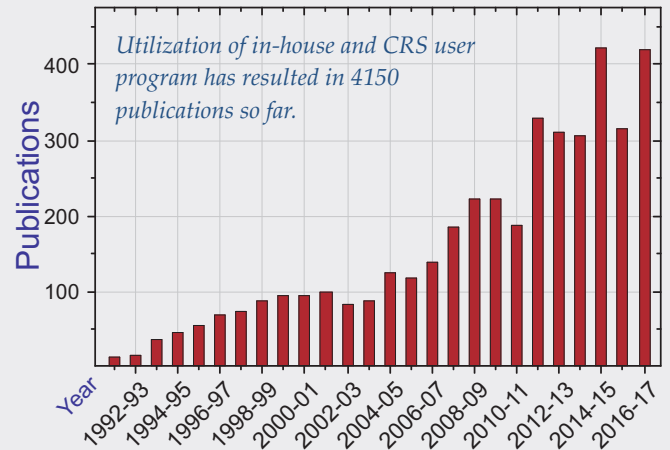
Neutron Diffractometer at Dhruva Reactor

Focusing crystal based neutron diffraction beamline was designed and installed by Consortium at Dhruva Reactor, BARC, Mumbai. The beamline employs open beam geometry and focusing neutron optics. The beamline became operational in 2007 and has attracted more than 100 long term CRS projects resulting in publications in several high impact factor journals.

Indian National Gamma Array (INGA)

UGC-DAE CSR is an important collaborator along with IUAC, TIFR, VECC, SINP and Universities for establishing INGA in early 2000. In the very early stages 5 Clover array were setup by Consortium together with TIFR & Andhra University.

Publications resulting from in-house and Consortium's CRS user program



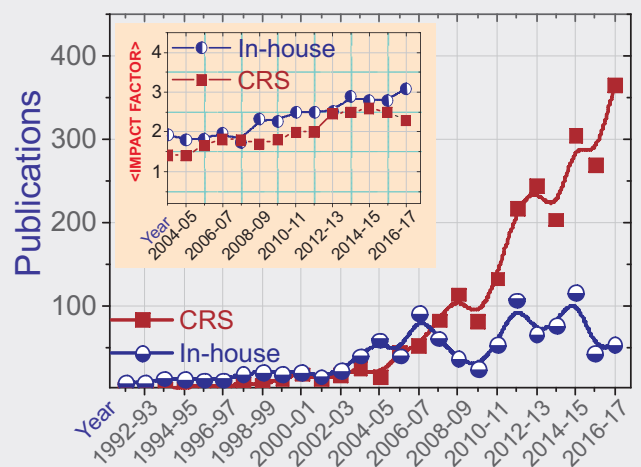
In last 10 years, on an average the number of collaborative publications per Consortium faculty per year has reached about 8.

Some of the high impact factor journals include **Physical Review Letters** (10), **Physical Review B** (>110), **Physical Review C,D,E** (~38), **Applied Physics Letters** (~60), **J. Appl. Phys.** (>180), **Journal of Physics: Condensed Matter** (~50), **RSI/MST** (~10), **Nanotechnology** (>10), **Journal of Materials Chemistry** (~6);

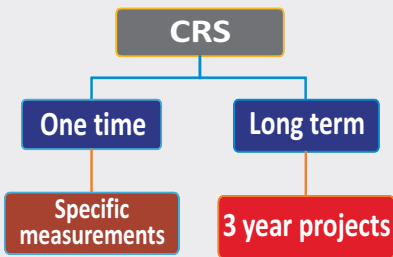
About 4000 documents in Scopus in last 10 years.

Consortium's Publications and Impact

In last 10 years not only no. of CRS publications have increased, their mean impact factor has also increased.

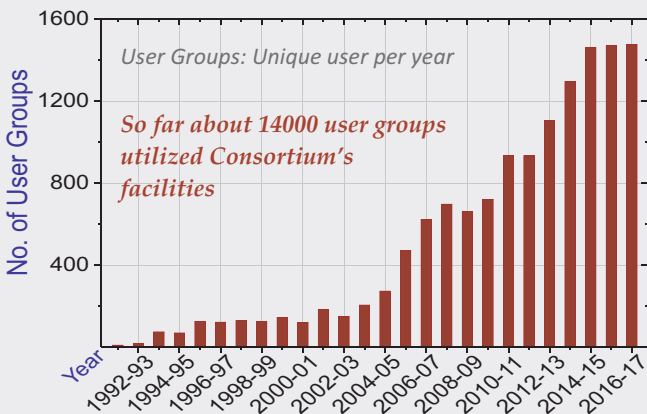


User Program of Consortium

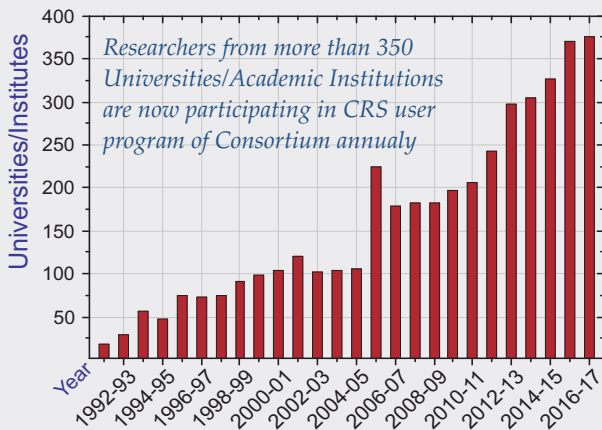


- Experimental facilities at the Consortium Centres and beamlines at DAE Mega Science facilities are accessible through CRS.
- One time CRS provides fast access for a measurement with minimal formalities.
- Long term CRS projects are sanctioned normally with a student fellowship after open presentation and review.
- University researcher are provided travel and local support to avail any CRS mode.

Utilization of Consortium's Facilities



Year wise participation of Universities / Academic Institutes in Consortium's CRS



LTHM Facilities



Materials Characterization Facilities



Electron Spectroscopy & Diffraction Facilities



Spectroscopy Facilities



Materials Synthesis & Surface Science Facilities



CONSORTIUM OUTREACH

Accessibility to experimental facilities

User's Support is extended under the Collaborative Research Scheme (CRS) of Consortium. All facilities of Consortium are available *free of cost* to users in Universities and Academic institutions. The support is also extended towards travel and local support to avail CRS.

Organization of Awareness / Thematic - Workshops / Schools / Lecture Modules & Conferences

The Consortium organizes through its three centres and the node, national conferences/workshops in universities to sensitize the university community across the nation towards the research opportunities accessible thru DAE mega-science facilities and various In-house research facilities. So far more than 100 such general awareness or thematically oriented research workshops have been organized by the Consortium.

The Consortium conducts special workshops/schools/lecture series for the research scholars across the universities and colleges.

General Outreach Activities

Participants for the above events and users are from different parts of the country including North East and J & K regions. Our outreach activities are quite extensively distributed geometrically across the whole of the nation as can be seen in a map shown elsewhere in this *brochure*.