One Day Workshop on Low Temperature Physics & Quantum Metrology

23rd April 2026 (Thursday)

Organised by

ICC – North Zone & CSIR-National Physical Laboratory
Venue: Conference Hall, 2nd Floor, Apex Metrology Laboratory, NPL

The program was chaired by Dr. R.G. Sharma, President – Indian Cryogenic Council with Prof. Venugopal Achanta – Director, NPL as the Chief Guest. Delegates from NPL, IUAC, JNU, JIIT, and Delhi Uni. and a good number of cryogenic industrial members from Delhi- NCR region attended the workshop.
The program started with a welcome address by Dr. Tushar Bhowmick, Chairman ICC-North Zone. In his address, he has mentioned about the new initiatives of ICC – North Zone after the recent formation of new executive committee.
This was followed by a speech from Dr. R.G. Sharma, President – Indian Cryogenic Council on the formation and journey of Indian Cryogenic Council during its 50 years of service to promote cryogenic research and collaboration between industry and academic institutions in India. He also spoke of the invaluable contribution from CSIR-NPL for its growth and expansion.

Commemorating with the golden jubilee year of ICC, an ICC directory named **"CRYO-CONNECT**" was released by Prof. Venugopal Achanta - Director, NPL on the occasion. This document was conceptualised by Dr. R G Sharma which was his long-standing desire. At his initiative, the ICC-North Zone took up the responsibility of compiling this document. Dr. Hari Kishan, Secretary NZ did most of the compiling work with help from Dr. Anuj Kumar.

In his address, Prof. Achanta – Director NPL mentioned about his connect with ICC when he had personally attended one of the "National Symposium on Cryogenics and Superconductivity" organized bi-annually by Indian Cryogenic Council. He has also mentioned about the pioneering initiatives of CSIR-NPL in cryogenic research in the past and the expanding into the emerging fields of Superconductivity, Quantum Metrology and Quantum Computing.

The inaugural session begun with the Inaugural Lecture by Dr. R.G. Sharma. The title of his lecture was "How Superconductors are Unlocking Inexhaustible Fusion Energy". In his 45 minute lecture he explained the fusion process and how efforts being made to create the sun in the laboratory and produces cleanest form of energy. He described how various fusion reactors in a number of countries are collecting critical data on fusion to help building world's biggest fusion reactor, the "ITER", expected to be completed by 2033. He told about the spherical small size tokamaks which are being built and tested for commercial production by a number of private companies. He ended his lecture by saying " Fusion energy is surely years away and not decades away".

The session was concluded by Dr. Pallavi Kushwaha scientist NPL proposing a vote of thanks. This was followed by Group Photograph and high tea.

Technical session -1 begin after a group photograph and high tea and was chaired by Dr. B. Saxena.

The first speaker was Dr. Anup Choudhury, Scientist from Inter University Accelerator Centre who spoke about his present research initiatives of making a Dilution Refrigerator at IUAC. In his talk he mentioned about the challenges faced on aspects of precision engineering, thermometry, instrumentation, and material of construction.

Dr. Dilip Shivagan from NPL talked about the Boltzman constant based New Kelvin standard which was the latest initiatives at Metrology Division of NPL.

This was followed by a presentation from Dr. Anish M Bhargava of NPL on superconducting photon detectors and its application which has an important role in Quantum Q-bits application.

The last presentation of the session was from Dr. Sanjay K. Sheet of NPL on Low temperature NMR in Metrology which was taken up after Lunch. The content highlights on the analytical approaches and the results there off.

Technical Session – 2 was chaired by Dr. V.N. Ojha.

The first speaker was Dr. Sandhya M Patel who spoke about the Josephson system for quantum voltage standards. In her talk she spoke about the possible application areas and its importance of using voltage standards with such system.

The next presentation was from Dr. Ashim K Pramanik from JNU – New Delhi and his topic was Low Temperature Behaviour in Topological Kagome-Lattice Magnet.

This was followed by a talk from Dr. R.S. Meena of NPL on Superconducting solution for future smart grid system.

Mr. Rajiv Sharma of NPL shared his experience on Cryogenic Plants and its role in Quantum Metrology at NPL through stabilised supply of Liquid Helium.

Before conclusion of the workshop, Dr. R. G. Sharma has requested the industries to get more and more associated with the council activities for any cryogenic aspects faced in their business operation.

At the end Dr. Harikishan – Secretary, ICC North Zone thanked all the participants for their presence and look forward to more of such interactive programs in coming time.

The main objective of the workshop to kickstart the activities of the NZ which was dormant for several years. With this as the top priority in mind Dr. Sharma suggested that NZ should hold a one-day workshop with the title “Low Temperature Physics and Quantum Metrology” at NPL. He together with Dr. Pallavi discussed the idea of the workshop with the director NPL, Prof. Venugopal Achanta. Prof. Gopal not only supported the idea, instead, he sponsored the workshop fully and ICC did not have to look for financial support elsewhere. Everything materialized in a month’s time. Entire infrastructural facilities were provided for the workshop by NPL and free. ICC and especially the Noth Zone remain grateful to him for this gesture. Our NPL colleagues organized the workshop with dedication and perfection. We hope that NPL scientists together with members from other R&D institutions in Delhi will take lead in this endeavour.
No registration fee was charged. Industrial partners were kind enough to provide Workshop bags and stationary items.

We take this opportunity to thank profusely Prof. Gopal, the entire NPL team for making the workshop a success.

Dr. Tushar Bhowmick
Chairman, ICC (North Zone)

Dr. Hari Kishan
Secretary, ICC (North Zone)