MEETING REPORT

DAE Solid State Physics Symposium 2002*

The annual Solid State Physics Symposium for the year 2002 had 340 participants and 312 papers were presented. The programme included 17 invited talks, three seminar sessions comprising eight talks, 25 oral presentations, nine theses (oral and poster), 253 poster presentations and two evening lectures.

On the first day, the scientific session started with a seminar on nano-materials coordinated by R. P. Bajpai (CSIO, Chandigarh). O. N. Srivastava (Banaras Hindu University, Varanasi) discussed salient features of carbon nano-tubes and nano-fibres including a discussion on the synthesis, characterization and exotic properties as well as the electrical transport and hydrogen storage characteristics of these materials. In the talk on metal clusters and nano-sized metal particles, S. K. Kulshreshtha (BARC, Mumbai) described briefly about the generation of metal clusters by an equipment based on laser ablation technique. The characterization of these metal clusters by time-of-flight mass spectrometry was also described in detail. Later, S. D. Mahanti (Michigan State University, USA) spoke about nano-structured materials and physics of quantum confinement.

In the invited talk on 'physics of locomotion of a biological cell', A. Baumgaertner (Forschungszentrum, Germany) discussed the conditions under which the motion of a cell is performed. Some biochemical details of the cyto-skeleton and polymerization-regulating proteins were also presented. V. B. Shenoy (IISc, Bangalore) delivered a talk on adhesion instabilities in soft thin films. He described a set of experiments in which the thin film pattern, induced by adhesive forces, depends only on the film thickness. A theoretical model of this interesting phenomenon as well as its possible applications were also presented.

In the evening, R. Chidambaram (Principal Scientific Advisor, Govt. of India) delivered a special lecture on 'Technology foresight and coherent synergy'. He highlighted that in our country, while synergy in research and development is a must, optimal technological developments require coherent synergy and thus should be an essential part of technological foresight.

On the second day of the symposium, S. Dattagupta (SNBNCBS, Kolkata) presented an overview of coherence to decoherence transitions in certain problems of condensed matter physics by taking examples from a variety of phenomena like quantum diffusion of hydrogen in metals and *c*-axis transport in high T_c superconductors. Later, Indra Dasgupta (IIT-Bombay) gave a talk on the electronic structure of high T_c magnetic superconductors in which he discussed the unusual electronic structure of novel magnetic superconductors $RuSr_2RCu_2O_8$ (R = Y, Gd). The phenomenon of coexistence of ferromagnetism and superconductivity in these compounds was also discussed. This was followed by a talk by Lavanya M. Ramaniah (BARC, Mumbai) on the first principles studies of condensed phase systems. She presented the results on several compounds such as fullerene, $AlPO_4$, etc., where the first principles calculations have provided better understanding of the phenomenon.

P. S. Goyal (IUC-DAEF, Mumbai) reviewed the results of the studies on the structure of micellar solutions using small-angle neutron scattering technique. D. K. Aswal (BARC, Mumbai) presented results of investigations on the nature of energy gap in MgB_2 superconductor using Andreev-reflection studies on MgB_2/Ag planar junctions. It was followed by a talk on the structural and optical properties of epitaxial GaN layers by B. Sundaravel (IGCAR, Kalpakkam). Later, I. Das (SINP, Kolkata) discussed the importance of magneto-caloric effect in rare-earth compounds and showed that this can be used to understand the nature of magnetic transitions even in small amounts of magnetic phases present in magnetic materials. The results of a comparative study of this effect with magneto resistance were also discussed.

In the evening, a lecture on 'Being and becoming: imaginary-time and real-time dynamics of electronic systems in external fields' by B. M. Deb (Punjab University, Chandigarh) was held.

On the third day, the sessions started with a seminar on structurally disordered and frustrated magnetic systems. S. N. Kaul (University of Hyderabad, Hyderabad) talked on the static and dynamic studies of magnetic irreversibility in spin systems with quenched random-exchange disorder, in which both theoretical and experimental developments in this field were reviewed. Shankar P. Das (JNU, New Delhi) spoke on the heterogeneities in supercooled liquids. Models for the supercooled liquid were presented, highlighting both the structural as well as the dynamical features. The supercooled state was described theoretically by incorporating the role of defects. The talk was followed by a presentation by G. D. Mukherjee (BARC, Mumbai) on the first-order polymorphism in fused quartz. He discussed the details of results on high pressure–temperature studies of fused quartz using the piston–cylinder apparatus.

M. S. Somayazulu (CIW-APS, USA) gave a detailed description of the X-ray diffraction facility belonging to the High Pressure Collaborative Access Team. It is used to investigate the behaviour of the materials at extreme (multimegabar) pressures and temperatures using synchrotron radiation. The techniques of focusing optics, *in situ* laser heating, *in situ* pressure measurements, Raman spectroscopy, low temperature–high pressure diffraction and single crystal diffraction were also highlighted. It was followed by a talk on the pressure-induced structural transitions in BaFX (X = Cl, Br, I) family of layered matlockites by N. Subramanian (IGCAR, Kalpakkam). The results of the high-pressure X-ray diffraction experiments on this system, showing a gradual reduction in symmetry with increase in pressure, were discussed. K. Tankeswar (Panjab University, Chandigarh) talked on the diffusive and collective motions, in binary liquid mixtures. This was followed by a presentation on the study of stochastic dynamics in condensed matter using neutron scattering techniques by R. Mukhopadhyay (BARC, Mumbai).

In the seminar session on ion beam interactions, D. K. Avasthi (NSC, New Delhi) explained what the swift heavy

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ions (SHI) could do to materials. In this talk, some of the results in the areas related to electronic sputtering, interface modifications, phase transitions and nanophase generation by SHI were discussed. An overview of the research facilities and research possibilities in materials science with SHI was also given. T. K. Chini (SINP, Kolkata) spoke about periodic morphology development on semiconductor surfaces induced by ion beams. He reported the latest experimental results on the development of periodic ripple morphology on Si (100) due to argon ion bombardment at an incident angle of 60° of the ions.

On the fourth day, Ajay Sood (IISc, Bangalore) highlighted the recent results of Raman and Brillouin scattering studies on charge-ordered manganite systems. H. R. Krishnamurthy (IISc, Bangalore) presented the main features of a new theory for understanding a variety of phenomena, including colossal magneto-resistance in doped perovskite manganites. This was followed by a talk by G. P. Das (BARC, Mumbai) on spintronics: the latest revolution in semiconductors. He presented a review of the current state of fundamental understanding of the origin of ferromagnetism in Mn-doped GaN and related systems. An emerging scenario of the applications of spintronics was also discussed.

The invited talk sessions were closed on the last day with the talk by V. K. Jindal (Panjab University, Chandigarh) on the carbon nanotube materials in single-wall and multi-wall formations. This was followed by a concluding session.

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FROM THE ARCHIVES

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Ramanujan: His Life and Work

In his review of G. H. Hardy's book on 'Ramanujan: His Life and Work', appearing in the July (1941) number of *Current Science*, Prof. Siddiqi says: "There is one remark of Prof. Hardy with which it is difficult to agree. Prof. Hardy says, 'I very much doubt whether Ramanujan, to the end of his life, ever understood at all clearly what an analytic function is'. It should be remembered that Ramanujan stayed at Cambridge for more than three years and *passed the Mathematical Tripos*. . . . However, if Prof. Hardy's conjecture is true, it does not speak much for the teaching of Mathematics at Cambridge which could not make a Ramanujan understand the nature of an analytic function at the end of a three years' course. We hardly think that Prof. Hardy himself would like to be forced to this conclusion".

It is incorrect to say that Ramanujan took the Mathematical Tripos, for, the B.A. Degree that he obtained at Cambridge was only a research degree. A life-sketch in the *Journal of the Indian Mathematical Society*, August 1919, says, 'At Cambridge he was given the research degree and the frontispiece shows him in his academical robes'.

Prof. Hardy himself observes in the collected papers of Ramanujan: 'He wished indeed to qualify for a Cambridge degree as a research student but this was a formality'.

K. CHANDRASEKHARAN

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University of Madras,
7 October 1941.

I, acknowledge my mistake, and gratefully accept Mr. Chandrasekharan's correction. However, I plead that my mistake was natural for various reasons.

(1) Before the last Great War, Cambridge academic life was dominated by the Mathematical Tripos, and every promising mathematics student went there for the Tripos. I was therefore under the impression that Ramanujan's Cambridge B.A. must have been due to his having taken the Tripos.

(2) The lowest research degree at Cambridge or any other University is that of M.Sc., and it would come as a surprise to most people that Ramanujan was awarded a research B.A. Degree at Cambridge.

I am not disputing the fact, but only explaining why the details about Ramanujan's degree escaped my notice. Both the quotations given by Mr Chandrasekharan do not specify the 'B.A. Degree', but mention only the research degree. I assume with Mr Chandrasekharan that they refer to the B.A. Degree. Anyway, one does not think much of degrees in connection with Ramanujan. They are immaterial. The main point for the purpose of my argument is, as I have explicitly stated in the passage cited by Mr Chandrasekharan, that Ramanujan stayed at Cambridge for more than three years. During this time he must have met and talked with many mathematicians at Cambridge—not to speak of Prof. Hardy himself, whom he met almost every day.

RAZIUDDIN SIDDIQI

Osmania University,
Hyderabad (Deccan),
17 November 1941.