Scientific Report on MPIPKS Workshop: Chaos and Collectivity in Many-Body Systems (CCM08) March 5- 8, 2008.

The workshop CCM08 was conceived as a multidisciplinary gathering of scientists at the Max-Planck-Institute for the Physics of Complex System to discuss topics of chaoticity and collectivity in the response of many-body systems of different sizes, such as the atomic nuclei, Bose-Einstein Condensates and mesoscopic devices such as quantum dots. The workshop was subdivided into blocks of 4 mornings and 4 afternoons over the period of four and a half days (one afternoon was put a side for an excursion). The number of registered participants was 47, with a larger number of attendees in the different session.

In the first morning on March 5, giant resonances in nuclei were discussed by leading nuclear physicists such as Thomas Aumann (GSI) and David Brink (Oxford). Eckart Grosse (FZD) gave a review on the decay of these collective nuclear states. The concept of "doorway states", of much use in nuclear physics, was then discussed in talks by Thomas Guhr (Duisburg-Essen) and Naftali Auerbach (Tel Aviv) among others. Whereas Auerbach emphasized the superradiance characteristics of these states, Guhr made the point of looking at these states as superscars in billiards using microwave oven analog computers. Eckart Grosse (FZD) gave a review on the decay of giant resonances.

The morning of the second day of the workshop was dedicated to condensed gases and ions. Ulf Saalmann (MPIPKS) talked about ultrafast collectivity in finite systems, while Eddy Timmermans (LANL) talked about fermionic BEC mixtures. V. S. Bagnato (São Carlos) talked about the experimental effort of his cold atom group and about Quantum Turbulence. Masud Haque (MPIPKS) spoke about vortices in BEC while A. F. R. de Toledo Piza (São Paulo) discussed cold bosons in cranked lattices and T. Kottos talked about quantum dissipation, irreversibility and pumping in Bose systems. The following morning was dedicated to quantum chaos, with Achim Richter (Darmstadt) speaking about Chaotic scattering study using microwaves, and Mauricio Pato (São Paulo) and Oriol Bohigas (Orsay) describing recent advances in Random Matrix Theory (RMT). Finally, Gary Mitchell (NCSU) described the study of nuclear spectroscopy using RMT. In the afternoon of the same third day of the workshop several talks were delivered concerning chaos in mesoscopic systems. Lev Kaplan (Luiziana) discussed chaos in quantum dots, Armando Perez decoherence in spin systems, N. Papanicolaou spoke about vortices in magnetic grains and S. Schmidt discussed the coexistence of superconductivity and ferromagnetism in chaotic metallic grains.

The last morning session held on Saturday, March 8, was dedicated to four talks on vortices in magnetic grains by Stavros Komineas (MPIPKS), networks of topological defects, by D. Bazeia (Paraiba), chaos in open systems, by Martina Hentschel (MPIPKS) and tunneling of composite systems by C. A. Bertulani (Texas A&M-Commerce).

The poster session was had in the evening of Friday, March 7. There were about 20 posters. The attendance of the session was quite good, as more than 50 people were present.

The workshop was a success as it brought together people in seemingly different areas of physics under the same roof with ample opportunity to discuss the similarities and differences in the systems being studied. The discussions which followed the talks were lively and very informative. Most of the sessions were very well attended, especially by young MPIPKS visiting scientists. A simple measure of the interest of the community in the Workshop can be attested by the number of attendees in the last, Saturday morning, session; there were more than 40 people present.

The success of the workshop owes a lot to the keen dedication of the secretary, Ms. Marita Schneider, whom I thank very much.

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