

Report of the Summer School
“Low-Dimensional Quantum Many-Body Systems”
Hotel Deutscher Hof, Trier, August 16 - 21, 2012
by Axel Pelster
Technische Universität Kaiserslautern



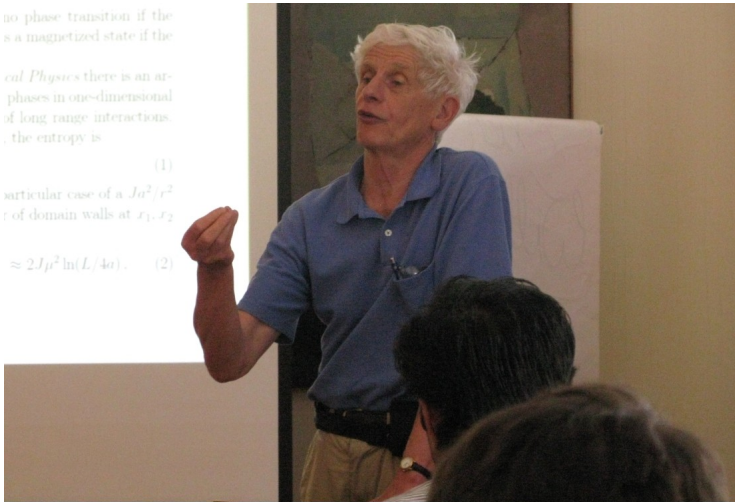
For the first time the **College for the Advancement of Postgraduate Studies** within the **Collaborative Research Center SFB/TR49** organized an international summer school, which was geared towards specific topics in methods and research for students. The summer school 2012, which took place in Trier, was open for international registration and consisted of 34 participants from at least 15 nations, half of which belonged to the SFB/TR49.

no phase transition if the
is a magnetized state if the
cal Physics there is an ar-
phases in one-dimensional
of long range interactions
the entropy is

(1)

particular case of a Ja^2/r^2
of domain walls at x_1, x_2

$\approx 2J\rho^2 \ln(L/4a)$. (2)



The topic of the summer school was “**Low-Dimensional Quantum Many-Body Systems**”, as it encompasses many research fields of the SFB/TR49 and is, therefore, of quite central importance. Low-dimensional many-body quantum systems reveal peculiar properties as both quantum and thermal effects are enhanced in less than three spatial dimensions. The experimental and theoretical experts

- David Thouless (Seattle, USA)
- Manfred Mark (Innsbruck, Austria)
- Gregory Astrakharchik (Barcelona, Spain)
- Laurent Sanchez-Palencia (Paris, France)
- Carlos A.R. Sa de Melo (Atlanta, USA)

provided in total 12 pedagogical overviews and introductory talks of 90 minutes duration on various selected special topics. Particular emphasis was devoted to a detailed discussion of the Tonks-Girardeau gas in 1d and the Berezinski-Kosterlitz-Thouless phase transition in 2d. Furthermore, the

recent realization of the low-dimensional Anderson localization of ultracold atoms in both laser speckle disorder potential and incommensurate optical lattices was also discussed. Finally, the delicate evolution from BCS to Bose superfluidity in two dimensions was addressed both without and with spin-orbit and Zeeman fields.

The booklet of the summer school as well as the slides of all talks are available on the web page

http://itp.uni-frankfurt.de/~kreisel/tr49/school_12

The leisure and pleasant atmosphere at the venue of the **Hotel Deutscher Hof** in Trier provided ample opportunities for lively and long-lasting discussions between the participants during the whole summer school. The extensive meals, the poster flash presentations at the first school day, and two long poster sessions provided the program backbone for these mutual exchanges. Additional group excursions of the town Trier were performed on a more private basis during the evenings.





On Sunday afternoon all participants attended an informative excursion of the town Trier, which is located on the banks of the Moselle. At first an extensive guided city tour provided an overview of the impressive historical background which ranges back to the Roman Empire and which is reflected by various remnants in the town architecture. Afterward, a visit of a nearby vineyard, which was located at the hillside of the Moselle valley, and a subsequent wine tasting completed the excursion.

