



Seminar

Integrable and non-integrable models in quantum optics

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Time: 4:00pm, April 6, 2017 (Thursday)

时间: 2017年4月6日 (周四) 下午 16:00

Venue: Room W563, Physics Building, Peking University

地点: 北京大学物理楼 西563

Abstract

The Quantum Rabi model, describing dipole interaction between a single mode of the radiation field and a two-level system, may be considered to be integrable if a criterion of quantum integrability suitable for systems with less than two continuous degrees of freedom is employed [1]. Diagonalization of the Hamiltonian corresponds to a solvable connection problem in the Bargmann space of analytic functions. I shall demonstrate that also more complicated models, non-integrable according to the proposed criterion, are exactly solvable within this framework [2]. Further generalizations with non-linear coupling [3,4] reveal close relations with the classical theory of asymptotic analysis in the complex domain.

References:

1. D. Braak, Phys. Rev. Lett. vol.107, p.100401 (2011).
2. D. Braak, J. Phys. B vol.46, p.224007 (2013).
3. S. Felicetti et al., Phys. Rev. A vol.92, p.033817 (2015) 4. L.W. Duan, Y.F. Xie, D. Braak and Q.H. Chen, J. Phys. A vol.49, p.464002 (2016).

About the Speaker

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| 1991-1995 | Karlsruhe University, Germany, Scholarship by the Graduiertenförderung Baden-Württemberg |
| 1995 | Ph.D, thesis "Renormalization Group Analysis and Self-consistent Theory of the 2D Random Bond Ising Model" with Prof. P. Wöle |
| 1995-1996 | Postdoc at Saarland University with Prof. G. Meissner |
| 1996-1998 | Research associate at Rutgers University, USA, with Prof. Natan Andrei, supported by a Fellowship of the Deutsche Forschungsgemeinschaft and Consultant at NEC Research, Princeton |
| 1998-2004 | Principal investigator of project E8 within the Collaborative Research Center 484, "Cooperative Phenomena in Solids" |
| 2010 | Lecturer at the Institute of Physics, University Augsburg |
| 2010-present | Research associate at the chair for Experimental Physics VI (theory division), Institute of Physics, University Augsburg, Fellow of the transregional Research Center 80 "From Electronic Correlations to Functionality" |

Dr. Daniel BRAAK has ever published one paper in PRL in 2011 for the analytically exact solution to the quantum Rabi model and its integrability. This is really a breakthrough work, and got more than 200 citations to date.