Curriculum Vitae, Hans-Jürgen Mikeska

Personal Data

Date of Birth:	July 19, 1937
Place of Birth:	Berlin
Status:	Married, 3 children

Education and Employments

1963	Ph. D. in Theoretical Physics (Techn. Univ. Munich / Supervisor: W. Brenig)
1963 - 67	Assistent (Research associate) at the Techn. Univ. Munich
1968 - 70	Research Associate at the Institute v.Laue-Langevin, Grenoble (German theory group) and Lecturer at the Techn. Univ. Munich
1971	Professor (chair of Theoretical Physics, C4), Univ. of Hannover Emeritus since 2004

Visits at Foreign Institutions

1967/68	University of Maryland at College Park, USA (1 year)
1975, 1977	Brookhaven National Laboratory, USA (5 months)
1979	Risoe National Laboratory, Denmark (2 months)
1981/82	Stanford University, USA (4 months)
1986	University of Virginia, Charlottesville, USA (2 months)
1991	University of Florence, Italy (3 months)
1992	University of Kyoto, Japan (3 months)
1996/97	Osaka University , Japan (7 months)
1998 - 2000	The Institute of Physical and Chemical Research (RIKEN), Japan (4 months)
1999	ITP at Santa Barbara, USA (Program: Magnetic Phenomena in Novel Materials and Geometries / 2 months)
2001	Hahn-Meitner Institut, Berlin (magnetism group leader / 6 months)
2007/08	Yukawa Institute of Theoretical Physics, Kyoto, Japan (3 months)

Specific Scientific Interests

Nuclear Many-Body Problem (64-68)
Paramagnons in Fermi Liquids (67/68)
Positron Annihilation in Metals (67-69)
Phase Transitions (Superfluid Helium, Superconductors; 68-72)
Low-Dimensional Systems without Long Range Order (Lattices, Magnets; 70-78)
Nonlinear Excitations (Solitons) in One-Dimensional Magnets (77-90)
Chaos in Magnetic Systems (83-89)
Low-Dimensional Quantum Antiferromagnets (91-)

Main scientific achievements

Phase transition without long range order in two dimensions (H.-J. Mikeska and H. Schmidt, J. Low Temp. Physics **2**, 371 (1970)):

First description of the possibility of phase transitions without long range order in two-dimensional crystals and superconductors. Followed in 1973 - 75 by a theory of the corresponding dynamics in crystals and magnets (phonons/magnons without long range order).

Solitons in a one-dimensional magnet with an easy plane (H.-J. Mikeska, J. Phys. C **11**, L29 (1978)):

First description of the contribution of solitons to the dynamic structure factor for the classical easy-plane ferromagnetic chain in an external symmetry breaking field. This paper stimulated numerous theoretical and experimental investigations as documented by more than 400 citations. Many details were worked out during the eighties and a summary of the results was given in the review with M. Steiner in Advances in Physics (1991).

Nonlinear dynamics of classical one-dimensional antiferromagnets (H.-J. Mikeska, J. Phys. C **13**, 2913 (1980)):

First theoretical treatment of the nonlinear dynamics of the 1d semiclassical antiferromagnet. This paper introduced the scheme which was later called nonlinear $\sigma-$model (and was used e.g. in the formulation of Haldane's conjecture); it stimulated many experimental and theoretical investigations, in particular on solitons in TMMC.

Chaos and quantum mechanics (H.Frahm and H.-J. Mikeska, Phys. Rev. Letters **60**, 3 (1988)):

The level statistics for the kicked rotator model is used to discuss the influence of quantum effects on classical chaos. Formally the strength of $\hbar$ is varied and quantum effects are shown to suppress classical chaos.

Quantum solitons (e.g.: H.-J. Mikeska, Chaos, Solitons and Fractals, **5**, 2585 (1995)):

Excitations in quantum systems corresponding to classical solitons are formulated and are shown to be relevant for observable properties of spin systems, in particular for the dynamics of $S = \frac{1}{2}$ chains, for the excitation continuum of dimerized spin ladders and for the Haldane condensation. The smooth connection between classical and quantum solitons was established.

Phase diagrams, exact ground states and exact excitations in 1D $S = \frac{1}{2}$ systems (e.g. A.K. Kolezhuk and H.-J. Mikeska, Phys. Rev. Letters **80**, 2709 (1998), Int. J. Mod. Physics B **12**, 2325 (1998)):

Allowing for both bilinear and biquadratic exchange hamiltonians were identified with exact ground states and exact low-lying excitations. The 1D Heisenberg antiferromagnet with alternation and next nearest neighbor exchange (generalized spin ladder) was shown to display first and second order phase transitions, but the two limiting models of the $S = 1-$chain and the $S = \frac{1}{2}-$ dimer chain lie in the same phase.
As a special application, ring exchange terms in spin ladders were shown to drive the system towards a quantum phase transition leading to the first consistent interpretation of experimental data for the exchange parameters (cooperation with N. Nagaosa and the neutron scattering group at ISIS).

International academics

Organisation of the “International Symposium on the Dynamics of One-Dimensional Magnets“ (Center of the German Physical Society, Bad Honnef, May 1980)

Fulbright grant in connection to the visit to Stanford University in 1981/82

NATO grant for international scientific cooperation with Prof. H. Fogedby, Aarhus, Denmark (1986/90)

Visiting professor at Kyoto University, Yukawa Institute of Physics (1992 and 2007/08), and at Osaka University, Dept. of Earth and Space Science (1996/97)

Visiting scientist at the Institute of Physical and Chemical Research (RIKEN), Tokyo, under the Eminent Scientist Award Program (1998/99)

Invited talks at more than 30 international conferences

Referee for a large number of international journals