

**Report on the  
,International Conference on Highly Frustrated Magnetism HFM2008'  
held from  
September 7<sup>th</sup> to 12<sup>th</sup>  
at the  
Technische Universität Carolo-Wilhelmina zu Braunschweig**

HFM2008 was held as a Science Meeting within the European Science Foundation Research Network Program 'Highly Frustrated Magnetism'.

HFM2008, the fourth event in the series of Conferences on Highly Frustrated Magnetism succeeded the successful meetings in Waterloo in Canada in the year 2000, Grenoble in France and Osaka in Japan, held two years ago.

HFM2008 intended to be a forum for scientist being active in the research of frustrated magnets form all over the world. The decision to hold HFM2008 in Germany attracted primarily conferees from Europe, but HFM2008 could also welcome about 75 colleagues from overseas. In total, HFM2008 hosted approximately 215 scientists from 25 countries.

HFM2008's scientific Program comprised sessions on Kagomé Systems, Spinel and Pyrochlores, New Highly Frustrated Systems Multiferroic Systems, Systems with Unconventional Order and Frustrated Chain Systems.

4 Plenary Lectures and 20 Invited Talks were given by leading scientists in the field of frustrated Magnetism. 25 Oral Contributions were selected out of approximately 220 submitted Abstracts. The organizers gratefully acknowledge the continuous support and advice from an International Advisory Board and the HFM2008 Program Committee when setting up the scientific Program of HFM2008. In addition to the Oral Sessions, two well attended Poster Sessions each with approximately 75 presented Posters were organized. For more details of the Scientific Program see the Attachment below. On special recommendation of the steering committee of ESF Research Network Program 'Highly Frustrated Magnetism' a Student Tutorial was organized providing three Tutorial Lectures for PhD students and young researchers.

The HFM2008 Conference Proceedings will be published in the beginning of the year 2009 as a Special Issue of IOP's open-access Journal of Physics: Conference Series (<http://www.iop.org/EJ/conf>) with Prof. Ilya Eremin (TU Braunschweig and MPI PKS Dresden) as the principal Editor.

Substantial financial Support (approximately 40% of the conference budget) was provided by the ESF, a startup operational fund and continuous logistic support was provided by the Max-Planck Society through a grant of the Max-Planck Institute for Solid State Research in Stuttgart and the TU Braunschweig and the City Council of Braunschweig. In addition to institutional funding, the HFM2008 asked for a Conference fee, 52 PhD students on special recommendations of their supervisors were accepted on a reduced Conference Fee.

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## **Program of Oral Presentations**

### **Sunday, 7 September**

#### **Student Tutorial (Chairperson: N.N.)**

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|---------------|--|----------------------|
| 14.00 - 14.50 | Highly Frustrated Magnets –<br>Materials and Materials Preparation                           | <u>J. E. Greedan</u> |
| 14.50 - 15.40 | Some Common and not so Common<br>Bulk Properties seen in Geometrically<br>Frustrated Magnets | <u>J. S. Gardner</u> |
| 14.50 - 15.40 | Probing Frustration through Neutron<br>Scattering  | <u>C. Broholm</u>    |

### **Monday, 8 September**

8.40 - 9.00      Opening

#### **Plenary Talk I (Chairperson: R. K. Kremer)**

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|------------|--|--------------------|
| 9.00- 9.40 | Topological Features of Magnetic<br>Materials and Models | <u>R. Moessner</u> |
|------------|--|--------------------|

#### **Kagomé Systems I (Chairperson: A. L. Chernyshyev)**

- |               |  |  |
|---------------|--|--|
| 9.40 - 10.10  | Surprises on the Ground State of the S-<br>1/2 Kagome-Like Lattice in<br>Volborthite   | <u>Z. Hiroi</u>  |
| 10.10 - 10.40 | Magnetization Dynamics in Artificial<br>Spin Ice   | <u>O. Tchernyshyov</u><br>and P. Mellado               |
| 11.10 - 11.40 | Valence Bond Crystal Phase of<br>Kagome Lattice Antiferromagnets   | <u>Rajiv R. P. Singh</u>                               |
| 11.40 - 12.10 | Frustrated Magnetism in the Quantum<br>Kagome Herbertsmithite<br>ZnCu <sub>3</sub> (OH) <sub>6</sub> Cl <sub>2</sub> Antiferromagnet | <u>F. Bert</u> , A. Olariu,<br>A. Zorko, P.<br>Mendels |
| 12.10 - 12.30 | Magnetic Monopoles in Spin Ice   | <u>C. Castelnovo</u> , R.<br>Moessner, S.              |

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|---------------|---|--------------------------------------|
| 12.30 - 12.50 | Order Parameter for Heisenberg Kagomé Antiferromagnet in Two and Three Dimensions | L.Sondhi<br><u>M. E. Zhitomirsky</u> |
|---------------|---|--------------------------------------|

### **Itinerant Systems I (Chairperson: M. Loewenhaupt)**

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|---------------|---|--|
| 14.30 - 15.00 | Strongly Correlated Electrons on Frustrated Lattices  | <u>H.Tsunetsugu</u> , T. Ohashi, N.Kawakami, T.Momoi, and K. Hattori |
| 15.00 - 15.30 | Metal-Insulator Transition and Spin Liquid Phases in Triangular-based lattices                      | <u>F. Becca</u> , L. Tocchio, D. Heidarian and S. Sorella            |
| 15.30 - 15.50 | Frustrated Mott Insulator TiOCl under Pressure and Doping. Is there a Chance for Superconductivity? | Yu-Zhong Zhang, H. O. Jeschke, <u>R. Valentí</u>                     |
| 15.50 - 16.10 | Anomalous Hall Effect due to Magnetic Chirality in the Pyrochlore Lattice                           | <u>A. Kalitsov</u> , C. Lacroix, B. Canals                           |

## **Tuesday, 9 September**

### **Plenary Talk II (Chairperson: J. Litterst)**

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|------------|---|---------------------|
| 9.00- 9.40 | Geometrical Frustration Effects in Phase Transition and Transport Phenomena | <u>S. Nakatsuji</u> |
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### **Spinel and Pyrochlore I (Chairperson: K. Penc)**

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|---------------|--|--|
| 9.40 - 10.10  | Frustrated Diamond Antiferromagnetism in A-site Spinel | <u>L. Balents</u> , J. Alicea, D. Bergman, E. Gull, S. Lee, L. Savary, S. Trebst |
| 10.10 - 10.40 | Frustrated Spin-Lattices in Spinel Compounds           | A. Krimmel, T. Rudolf, Ch. Kant, F. Mayr, V. Tsurkan, <u>A. Loidl</u>            |
| 11.10 - 11.30 | An Investigation of the Frustrated                     | <u>K.C. Rule</u> , G. Ehlers,  |

- Pyrochlores  $Tb_2Ti_2O_7$  and  $Tb_2Sn_2O_7$  with Polarised Neutrons
- 11.30 - 11.50 Ordered Magnetic Structures in  $Tb_2Ti_2O_7$  and  $Tb_2Sn_2O_7$  Induced by Applied Field or Pressure
- 11.50 - 12.10  $\mu$ SR and Magnetization Studies of Square-lattice  $J_1$ - $J_2$  System  $Cu(Cl,Br)La(Nb,Ta)_2O_7$ : Spin-Gap, Phase Separation, and History Dependence near Quantum Phase Boundary
- J. R. Stewart, P. P. Deen, Y. Qiu, B. D. Gaulin, and J. S. Gardner
- H. Cao, I. Mirebeau, A. Gukasov, I. Goncharenko, and P. Bonville
- Y. J. Uemura, A. A. Aczel, Y. Ajiro, J. P. Carlo, T. Goko, D. A. Goldfeld, A. Kitada, G. M. Luke, G. J. MacDougall, I. G. Mihailescu, J. A. Rodriguez, P. L. Russo, Y. Tsujimoto, C. R. Wiebe, T. J. Williams, K. Yoshimura and H. Kageyama

### **New Systems (Chairperson: Z. Hiroi)**

- 13.30 - 14.00 Spin Liquid State in  $S = 1/2$  Hyper-Kagomé Antiferromagnet  $Na_4Ir_3O_8$
- 14.00 - 14.30 Artificial Frustrated Magnets
- 14.30 - 14.50 Frustrated Antiferromagnets on Depleted Lattices
- 14.50 - 15.10 Spin and Orbital Degrees of Freedom and the Ground States of Monoclinic Ordered Double Perovskites:  $La_2LiMO_6$  with  $M = Ru, Re, Mo$
- Y. Okamoto, S. Fujiyama and H. Takagi
- P. Schiffer
- Chr. L. Henley
- T. Aharen, J.E. Greedan, C.A. Bridges, S. Derakhshan, G.M. Luke, T. Imai, A. Aczel, G. MacDougall, and J. Rodriguez

## **Triangular Systems (Chairperson: N. N.)**

- 15.40 - 16.00 Vortex Dispersion and Condensation in the RVB phase of Quantum Dimer Models F. Mila
- 16.00 - 16.20 Spin-Orbital Liquid States on the Triangular Lattice B. Normand, A. M. Oleś
- 16.20 - 16.40 Raman Scattering in a Heisenberg  $S = 1/2$  Antiferromagnet on the Triangular Lattice N. Perkins, W. Brenig

## **Wednesday, 10 September**

## **Plenary Talk III (Chairperson: W. Brenig)**

- 9.00- 9.40 Multiferroicity in Frustrated Magnets Sang-Wook Cheong

## **Spinels and Pyrochlore II (Chairperson: P. Bonville)**

- 9.40 - 10.10 Dipolar Phases in Pyrochlore Magnets S. T. Bramwell
- 10.10 - 10.40 Highly Frustrated Magnetic Rare Earth Pyrochlore Oxides: Recent Progress and Open Questions M. J. P. Gingras
- 11.10 - 11.30 Magnetization Process of Geometrically Frustrated Spinel Oxide up to an Ultra-high Magnetic Field E. Kojima, H. Ueda, Y. Ueda, A. Miyata, S. Miyabe, S. Takeyama
- 11.30 - 11.50 The Topologically Constrained Physics of Spin Ice L.D.C. Jaubert, P.C.W. Holdsworth
- 11.50 - 12.10 Ordering of the Pyrochlore Ising Model with the Long-Range RKKY Interaction A. Ikeda, H. Kawamura
- 12.10 - 12.30 Field induced Magnetic Order in the Frustrated Magnet Gadolinium Gallium Garnet O.A. Petrenko, G. Balakrishnan, D.McK Paul, M. Yethiraj, G.J. McIntyre

## **Multiferroics (Chairperson: A. Loidl)**

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|---------------|--|--|
| 14.00 - 14.30 | Unconventional Magnetic Multipole Orders in Frustrated Spin Systems  | <u>M. Mostovoy</u>   |
| 14.30 - 15.00 | Ferroelectricity from Magnetic Order   | <u>M. Kenzelmann</u>   |
| 15.00 - 15.20 | Low-Magnetic-Field Control of Electric Polarization Vector in a Helimagnet $\text{Ba}_2\text{Mg}_2\text{Fe}_{12}\text{O}_{22}$ | <u>S. Ishiwata</u> ,<br>Y. Taguchi,<br>H. Murakawa,<br>Y. Onose, Y. Tokura   |
| 15.20 - 15.40 | Spin Chirality, Spontaneous Currents and Electric Polarization in Frustrated Mott Insulators                                   | L. N. Bulaevskii, C.<br>D. Batista, M. V.<br>Mostovoy, <u>D.</u><br><u>Khomsii</u>   |
| 15.40 - 16.00 | Manipulating the Magnetic Structure by Electric Fields in Multiferroic $\text{ErMn}_2\text{O}_5$                               | <u>Y. Bodenthin</u> , U.<br>Staub, M. García-<br>Fernández, M.<br>Janoschek, J.<br>Schlappa,<br>S. Gvasaliya, E. I.<br>Golovenchits, V. A.<br>Sanina, S. G.<br>Lushnikov |

## **Thursday, 11 September**

## **Unconventional Order (Chairperson: S. Trebst)**

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|---------------|---|------------------------|
| 9.00 - 9.30   | Phase Transitions in Geometrically Frustrated Magnets                                     | <u>J. T. Chalker</u>   |
| 9.30 - 10.00  | Novel Ordered Phases in the Shastry-Sutherland Spin System $\text{SrCu}_2(\text{BO}_3)_2$ | <u>M. Takigawa</u>     |
| 10.00 - 10.30 | Plateaux and Supersolid Phases in $\text{SrCu}_2(\text{BO}_3)_2$                          | <u>Kai P. Schmidt</u>  |
| 11.00 - 11.20 | Mixed Columnar-Plaquette Phase of Hard-Core Bosons on the Checkerboard Lattice            | <u>S. Wessel</u>       |
| 11.20 - 11.40 | Phase diagram of the spin-1/2 $J_1$ - $J_2$ - $J_3$                                       | <u>P. Sindzingre</u> , |

	model on the Square Lattice with Ferromagnetic $J_1$	Tsutomu Momoi, N. Shannon, L. Seabra
11.40 - 12.00	Statistics of Holons in the Quantum Dimer Model	<u>D. Poilblanc</u>
12.00 - 12.30	Quantum Spin Liquids on Ladders and in Two Dimensions	<u>Matthew P.A. Fisher</u>

### **Kagomé Systems II (Chairperson: H.-U. Everts)**

14.30 - 15.00	Magnetic and Structural Transitions in Frustrated Spinels and Kagomés	<u>S.-H. Lee</u>
15.00 - 15.20	Non-Magnetic Ground State in New Kagomé Antiferromagnet $\text{Rb}_2\text{Cu}_3\text{SnF}_{12}$	<u>T. Ono</u> , K. Morita, M. Yano, H. Tanaka, K. Fujii, H. Uekusa, Y. Narumi, and K. Kindo
15.20 - 15.40	Kinetic Ferromagnetism on Frustrated Lattices	<u>F. Pollmann</u> , K. Shtengel, and P. Fulde
15.40 - 16.00	Engineering Order-from-Disorder	Y. Motome, K. Penc and <u>N. Shannon</u>
16.00 - 16.20	Easy-Axis Kagome Antiferromagnet: Local-Probe Study of $\text{Nd}_3\text{Ga}_5\text{SiO}_{14}$	A. Zorko, F. Bert, <u>P. Mendels</u> , P. Bordet, P. Lejay, J. Robert
16.20 - 16.40	Distinguishing a Spin-Liquid State from a Valence-Bond-Crystal in the Kagomé Antiferromagnet	<u>O. Cépas</u> , J.O. Haerter, C. Lhuillier

## **Friday, 12 September**

### **Plenary Talk IV (Chairperson: I. Eremin)**

9.00- 9.40	Quantum Phases of Frustrated and Doped Antiferromagnets	<u>S. Sachdev</u>
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### **Chain Systems (Chairperson: J. Richter)**

9.40 - 10.10	Emergent Multipolar spin Correlations in a Fluctuating Spiral - The Frustrated Ferromagnetic	<u>A. M. Läuchli</u>
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	Heisenberg Chain in a Magnetic Field	
10.10 - 10.30	Interplay of Frustrated Magnetism and Paraelectricity in the Quantum Spin-Chain Compound $\text{Li}_2\text{CuZrO}_4$	V. Kataev, A. Sotnikov, R. Klingeler, S.-L. Drechsler, Y. Arango, E. Vavilova, O. Volkova, A. Vasiliev, and <u>B. Büchner</u>
10.30 - 10.50	Magnetic Ground State and Excitations of a Frustrated Square Lattice Quantum Antiferromagnet	<u>M. Enderle</u> , E. Wheeler, B. Fåk, A. Prokofiev
10.50 - 11.10	Spin Dynamics of the 1D Distorted Diamond Chain Azurite, $\text{Cu}_3(\text{CO}_3)_2(\text{OH})_2$	K. Rule, A.U.B. Wolter, <u>S. Süllow</u> , D.A. Tennant, B. Wolf, M. Lang, J. Schreuer
11.10 - 12.00	Conference Summary	<u>C. Lhuillier</u> , H. Takagi
12.00 - 12.30	Best Poster Award, Closing	<u>H. Kawamura</u> , P. Lemmens, W. Brenig