

## Dr. Yasir Iqbal

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CONTACT INFORMATION	Lehrstuhl für Theoretische Physik I Institut für Theoretische Physik und Astrophysik University of Würzburg Am Hubland, Campus Süd Würzburg, D-97074 Germany	<i>Tel (Office):</i> +49 931 31-84955 <i>Fax:</i> +49 931 3185141 <i>E-mail:</i> yiqbal@physik.uni-wuerzburg.de
PERSONAL INFORMATION	Nationality: India Date of Birth: 27/06/1986 Languages: English, Hindi	
RESEARCH INTERESTS	Theoretical condensed matter physics, strongly correlated systems, frustrated magnetism, quantum spin liquids, topological orders, state-of-the-art numerical methods, functional renormalization group methods for spin systems, variational quantum Monte Carlo and Green's function (fixed-node) Monte Carlo methods, fluid dynamics of quantum gases	
EDUCATION	<b>University of Würzburg, Würzburg, Bavaria, Germany</b> Postdoctoral Research Scientist, Theoretical Physics, 01/10/2014 - <i>till date</i> <ul style="list-style-type: none"><li>• Research Topic: “Development and application of functional renormalization group methods to frustrated spin systems and the study of novel states of matter in magnetic systems”</li><li>• Research Group Head: Prof. Dr. Ronny Thomale</li></ul> <b>The Abdus Salam International Centre for Theoretical Physics (ICTP), Trieste, Italy</b> <i>Condensed Matter and Statistical Physics Section</i> Postdoctoral Research Fellow, Theoretical Physics, 01/10/2012 - 28/09/2014 <ul style="list-style-type: none"><li>• Research Topic: “Study of the effect of quantum statistics on the flow patterns of driven quantum gases and its connection to turbulence”</li><li>• Research Group Head: Prof. Dr. Markus Müller</li><li>• Research Topic: “Study of the problem of the ground state and spin excitations of the Heisenberg model on the highly frustrated lattices”</li><li>• Research Collaborator: Dr. Federico Becca (SISSA, Trieste, Italy)</li></ul> <b>University of Toulouse III - Paul Sabatier and Centre national de la recherche scientifique (CNRS), Toulouse, France</b> <i>Strongly correlated systems group, Laboratoire de Physique Théorique</i> Ph.D., Physics, September, 2012 <ul style="list-style-type: none"><li>• Thesis Topic: “Spin liquids in quantum antiferromagnetic models on two dimensional frustrated lattices”</li><li>• Advisor: Prof. Dr. Didier Poilblanc</li><li>• Ph.D. studies: 01/10/2009 - 30/09/2012 (Defended on: 24/09/2012)</li></ul> <b>Indian Institute of Technology Madras (IITM), Chennai, India</b> <i>Department of Physics</i> M.Sc., Physics, May, 2009 <ul style="list-style-type: none"><li>• Thesis Topic: “Study of the spectrum of the (scalar) Laplacian on five-dimensional Einstein-Sasaki manifolds such as <math>S^5</math>, <math>Y^{p,q}</math>, and <math>L^{p,q,r}</math> that arise in the context of AdS-CFT correspon-</li></ul>	

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- Advisor: Prof. Suresh Govindarajan
- M.Sc. studies: 07/2007 - 05/2009

**University of Delhi**, Delhi, India  
*Sri Venkateswara College*

B.Sc. (Hons.), Physics, May, 2007

- B.Sc. studies: 07/2004 - 05/2007

**Delhi Public School**, R. K. Puram Sector XII, New Delhi, India

All India Senior School Certificate Examination (CBSE), 2004

- Subjects: Physics, Chemistry, Mathematics, Economics, English

TEACHING  
EXPERIENCE

**The Abdus Salam International Centre for Theoretical Physics (ICTP)**, Trieste, Italy

*Teaching Assistant*

**October 2012 - January 2013**

ICTP Diploma course - Statistical Mechanics

**University of Würzburg**, Würzburg, Germany

*Teaching Assistant*

**Summer Semester 2015**

Bachelor Course - Theoretical Quantum Mechanics

*Teaching Assistant*

**Winter Semester 2015/16**

Bachelor Course - Hauptseminar

SCIENTIFIC DUTIES Referee for Physical Review B, Physical Review Letters, and Reviews of Modern Physics

PUBLICATIONS

- Valence-bond crystal in the extended kagome spin- $\frac{1}{2}$  quantum Heisenberg antiferromagnet: A variational Monte Carlo approach. **Yasir Iqbal**, Federico Becca, and Didier Poilblanc. Phys. Rev. B **83**, 100404(R) (2011). Citations: 38
- Projected wave function study of  $Z_2$  spin liquids on the kagome lattice for the spin- $\frac{1}{2}$  quantum Heisenberg antiferromagnet. **Yasir Iqbal**, Federico Becca, and Didier Poilblanc. Phys. Rev. B **84**, 020407(R) (2011). *Editors' suggestion*. Citations: 64
- Valence-bond crystals in the kagomé spin-1/2 Heisenberg antiferromagnet: a symmetry classification and projected wave function study. **Yasir Iqbal**, Federico Becca, and Didier Poilblanc. New J. Phys. **14**, 115031 (2012). Focus issue on “Quantum spin liquids” of New Journal of Physics. Citations: 15
- Gapless spin-liquid phase in the kagome spin- $\frac{1}{2}$  Heisenberg antiferromagnet. **Yasir Iqbal**, Federico Becca, Sandro Sorella, and Didier Poilblanc. Phys. Rev. B **87**, 060405(R) (2013). *Highly Cited Paper (Web of Science)*. Citations: 93
- Quantum-statistics-induced flow patterns in driven ideal Fermi gases. Marco Beria, **Yasir Iqbal**, Massimiliano Di Ventra, and Markus Müller. Phys. Rev. A **88**, 043611 (2013). Citations: 3

- Vanishing spin gap in a competing spin-liquid phase in the kagome Heisenberg antiferromagnet. **Yasir Iqbal**, Didier Poilblanc, and Federico Becca. Phys. Rev. B **89**, 020407(R) (2014). Citations: 36
- Spin- $\frac{1}{2}$  Heisenberg  $J_1$ - $J_2$  antiferromagnet on the kagome lattice. **Yasir Iqbal**, Didier Poilblanc, and Federico Becca. Phys. Rev. B **91**, 020402(R) (2015). Citations: 17
- Lanczos steps to improve variational wave functions. F. Becca, W.-J. Hu, **Y. Iqbal**, A. Parola, D. Poilblanc, and S. Sorella. J. Phys.: Conf. Ser. **640**, 012039 (2015). Citations: 2
- Paramagnetism in the kagome compounds  $(\text{Zn,Mg,Cd})\text{Cu}_3(\text{OH})_6\text{Cl}_2$ . **Yasir Iqbal**, Harald O. Jeschke, Johannes Reuther, Roser Valentí, I. I. Mazin, Martin Greiter, Ronny Thomale. Phys. Rev. B **92**, 220404(R) (2015). Citations: 17
- Spin liquid nature in the Heisenberg  $J_1$ - $J_2$  triangular antiferromagnet. **Yasir Iqbal**, Wen-Jun Hu, Ronny Thomale, Didier Poilblanc, Federico Becca. Phys. Rev. B **93**, 144411 (2016). *Editors' suggestion*. Citations: 12
- Functional renormalization group for three-dimensional quantum magnetism. **Yasir Iqbal**, Ronny Thomale, Francesco Parisen Toldin, Stephan Rachel, and Johannes Reuther. Phys. Rev. B **94**, 140408(R) (2016). Citations: 5
- Intertwined nematic orders in a frustrated ferromagnet. **Yasir Iqbal**, Pratyay Ghosh, Rajesh Narayanan, Brijesh Kumar, Johannes Reuther, and Ronny Thomale. Phys. Rev. B **94**, 224403 (2016). Citations: 2
- *Total Citations: 302; Average Citation per item: 27.45, h-index: 8*

ARXIV PRE-PRINTS

- Comment on "Z<sub>2</sub> spin liquid phase on the kagome lattice: a new saddle point", by Tao Li [arXiv:1601.02165 (2016)]. **Yasir Iqbal**, Didier Poilblanc, and Federico Becca. Citations: 0

CONFERENCE PRESENTATIONS

**Invited Talk:** *The diverse footprints of quantum spin liquids in 3D frustrated magnets: Cogwheels, boomerangs, and much more*, Conference on Frustrated Magnetism, Institute of Mathematical Sciences (IMSc), Chennai, India, 10-12 April, 2017.

Contributed Talk: *Intertwined nematic orders in a frustrated ferromagnet*. DPG Spring Meeting, TU Dresden, Dresden, Germany, 19 - 24 March, 2017.

Contributed Talk: *Intertwined nematic orders in a frustrated ferromagnet*. Workshop "Entanglement in Strongly Correlated Systems", Centro de Ciencias de Benasque Pedro Pascual, Benasque, Spain, 5 - 18 February , 2017.

**Invited Talk:** *Intertwined nematic orders in a frustrated ferromagnet*. Conference on "Recent progress in low-dimensional quantum magnetism", EPFL, Lausanne, Switzerland, 5-16 September, 2016.

Contributed Talk: *Functional Renormalization Group for three-dimensional Quantum Magnetism*. DPG "Spring Meeting", University of Regensburg, Regensburg, Germany, 7 - 11 March, 2016.

Contributed Talk: *A novel method to study three-dimensional quantum magnetism and a spin liquid on the cubic lattice*. Workshop "Entanglement in Strongly Correlated Systems", Centro de Ciencias de Benasque Pedro Pascual, Benasque, Spain, 14 - 27 February , 2016.

**Invited Talk:** *Paramagnetism in Kagome compounds: A functional renormalization group approach.* Workshop on “Topological Phases in Condensed Matter and Cold Atoms Systems”, IESC Cargèse, Corsica, France, 31 August till 12 September, 2015.

**Invited Talk:** *The Heisenberg model on the kagome lattice: Recent developments.* Workshop on “Current Trends in Frustrated Magnetism”, Jawaharlal Nehru University (JNU), New Delhi, India, 9 - 13 Feb, 2015.

Contributed Talk: *The Heisenberg model on the kagome lattice: Recent developments.* Program on “Novel directions in frustrated and critical magnetism”, Nordic Institute for Theoretical Physics (NORDITA), Stockholm, Sweden, 14 July - 8 August, 2014.

Contributed talk: *Magnetically disordered phases stabilized in frustrated lattices with synthetic gauge fields.* Workshop on “New magnetic field frontiers in atomic/molecular and solid-state physics”. École de Physique, Les Houches, France, 5 - 10 May, 2013.

PREDOCTORAL  
RESEARCH  
INTERNSHIPS

**National University of Singapore**, Singapore  
*Department of Physics*

Summer Research Internship, Theoretical Physics, 14/05/2007 - 22/06/2007

- Research Topic: “Study of entangled qubit pairs for a quantum state on a line”
- Advisor: Prof. Dr. Berthold Georg Englert

**University of Stuttgart**, Stuttgart, Germany  
*Institute for Computational Physics*

Summer Research Internship, Theoretical Physics, 07/05/2008 - 27/07/2008

- Research Topic: “Calculation of the Generalized Mittag-Leffler Function”
- Advisor: Prof. Dr. Dr. Rudolf Hilfer

COMPUTER SKILLS

- Languages: Fortran, Mathematica, MATLAB
- MPI parallel processing libraries, Linear algebra packages
- Operating Systems: Unix/Linux, Macintosh, Windows

REFERENCES

- Prof. Dr. Ronny Thomale  
Lehrstuhl für Theoretische Physik I  
Institut für Theoretische Physik und Astrophysik  
Julius-Maximilians-Universität Würzburg  
Am Hubland, Campus Süd  
97074 Würzburg, Germany

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Fax: +49 931 3185141

- Prof. Dr. Didier Poilblanc  
Laboratoire de Physique Théorique (CNRS)  
IRSAMC  
Université Paul Sabatier  
Bât. 3R1B4  
118 Route de Narbonne

31062 Toulouse Cedex 04, France

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