

## Topological States & Phase Transitions in Strongly Correlated Systems

Kavli Institute for Theoretical Sciences (KITS), UCAS

Jul. 3 – Jul. 21, 2017

University of Chinese Academy of Sciences

No. 3 Zhong-Guan-Cun Nan-Yi-Tiao Road, Haidian Dis.

Beijing, China

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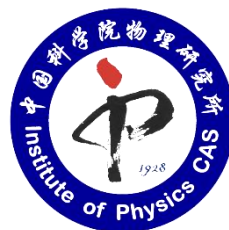
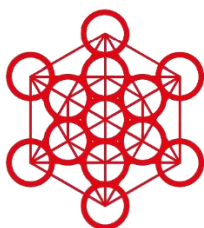
Liang Fu (MIT)

Kai Sun (Univ. of Michigan)

Yi-Zhuang You (Harvard)

## Sponsors

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# Conference Program

## Note

SPT:	Symmetry protected topological states
QSL:	Quantum spin liquid
DQC:	Deconfined quantum criticality
QSI:	Quantum spin ice
ITF:	Interacting topological fermion systems
SET:	Symmetry enriched topological orders
TSC:	Topological superconductors

## WEEK 1

### Jul. 3

09:15-09:30	<b>Fu-Chun Zhang</b> (KITS)	Welcome Speech
09:30-10:45	<b>Xie Chen</b> (Caltech)	Fracton topological orders
10:45-11:00	<i>Tea Break</i>	
11:00-12:15	<b>Lukasz Fidkowski</b> (Stony Brook Univ.)	Topological phases in driven systems and quantum information flow
12:30-14:00	<i>Lunch</i>	
14:00-15:15	<b>Takashi Imai</b> (McMaster Univ.)	Single crystal NMR investigation of the kagome lattice in herbertsmithite

### Jul. 4

09:00-10:15	<b>Shuo Yang</b> (Perimeter Institute)	Lattice model constructions for gapless domain walls of topological phases
10:15-11:00	<i>Tea Break</i>	
11:00-12:15	<b>Yizhi You</b> (Princeton)	Fractional Berry phase effect and composite particle hole liquid in partial filled Landau level
12:15-14:00	<i>Lunch</i>	
14:00-15:15	<b>Lu Li</b> (Univ. of Michigan)	Rotational Symmetry Breaking in a Trigonal Superconductor Nb-doped Bi <sub>3</sub> Se <sub>3</sub>
15:15-16:00	<i>Tea Break</i>	

16:00-17:15 **Kazushi Kanoda**  
(Tokyo Univ.) Strongly correlated topological states in organics; quantum spin liquids and Weyl fermion phases

### Jul. 5 (SPT Day)

09:00-10:15 **Ying Ran**  
(Boston College) Symmetry enforced SPT phases

10:15-11:00 *Tea Break*

11:00-12:15 **Zheng-Cheng Gu**  
(CUHK) Towards a complete classification of symmetry protected topological phases for interacting fermions in three dimensions and a general group supercohomology theory

12:15-14:00 *Lunch*

16:00-17:15 **Shinsei Ryu**  
(Chicago Univ.) Many-body topological invariants for fermionic SPT phases

### Jul. 6 (QSL Day)

09:00-10:15 **Tao Xiang**  
(IOP, CAS) Gapless Spin-Liquid Ground State in the Kagome Heisenberg Antiferromagnet

10:15-11:00 *Tea Break*

11:00-12:15 **Tian-Heng Han**  
(Univ. of Chicago & Argonne) Scattering and high-field thermodynamic studies on two-dimensional frustrated antiferromagnetism

12:15-14:00 *Lunch*

14:00-15:15 **Bruce Gaulin**  
(McMaster Univ.) Quantum Ground States in XY Pyrochlore Magnets

15:15-16:00 *Tea Break*

16:00-17:15 **Kazushi Kanoda**  
(Tokyo Univ.) Strongly correlated topological states in organics; quantum spin liquids and Weyl fermion phases

### Jul. 7 (DQC Day)

09:00-10:15 **Anders Sandvik**  
(Boston Univ.) Role of two length scales at the deconfined quantum-critical point

10:15-11:00 *Tea Break*

11:00-12:15 **Senke Xu**  
(UC Santa Barbara) Duality between 2+1d quantum critical points

12:15-14:00 *Lunch*

14:00-15:15 **Wen-An Guo**  
(BNU) Phases and phase transitions in the two-dimensional pure and disordered JQ models

## Week 2

### Jul. 10 (QSL Day)

09:00-10:15 **Shi-Yan Li**  
(Fudan Univ.) Heat transport study of spin liquid candidates

10:15-11:00 *Tea Break*

11:00-12:15 **Qing-Ming Zhang**  
(Renmin Univ.) Exploring quantum spin-frustrated materials

12:15-14:00 *Lunch*

14:00-15:15 **Yao Shen**  
(Fudan Univ.) Spinon excitations in YbMgGaO<sub>4</sub>

15:15-16:00 *Tea Break*

16:00-17:15 **Guang-Yu Guo**  
(NTU) Magnetism and Chern Insulating Phase in Layered Oxides with Honeycomb and Triangular Lattices

### Jul. 11 (QSI Day)

09:00-10:15 **Yuan Wan**  
(Perimeter Institute) Spinon walk in quantum spin ice

10:15-11:00 *Tea Break*

11:00-12:15 **Shigeki Onoda**  
(RIKEN) Quest to U(1) quantum spin liquids, valence bond solids, novel ordered phases in pyrochlores and spinels: unconventional quasiparticles and interference effects

12:15-14:00 *Lunch*

14:00-15:15 **Owen Benton**  
(RIKEN) Instabilities of quantum spin ice state

### Jul. 12 (QSL Day)

09:00-10:15 **Hai-Dong Zhou**  
(Tennessee Univ.) Frustrated magnetism in layer compounds with triangular and kagome lattices

10:15-11:00 *Tea Break*

11:00-12:30 **Jia-Wei Mei** (S. Univ. of Sci. and Tech.), **Shi-Liang Li** (IOP, CAS) & **Zili Feng** (IOP, CAS) Identifying a Gap in Kagome Spin Liquid: Properties of  $\text{Cu}(4-x)\text{Zn}(x)(\text{OH})_6\text{FBr}$  family

12:30-14:00 *Lunch*

### Jul. 13 (ITF Day)

09:00-10:15 **Akira Furusaki** (RIKEN) Breakdown of free-fermion classification of topological insulators and Superconductors

10:15-11:00 *Tea Break*

11:00-12:15 **Fakher F. Assaad** (Universität Würzburg) Lattice fermions coupled to a transverse Ising field.

12:15-14:00 *Lunch*

14:00-15:15 **Hong Yao** (Tsinghua Uni.) Fermion-induced quantum critical points and emergence of spacetime supersymmetry: renormalization-group and sign-problem-free QMC studies

### Jul. 14

09:00-10:15 **Chong Wang** (Harvard Univ.) A web of dualities in condensed matter physics: from quantum Hall effect to exotic quantum criticality

10:15-11:00 *Tea Break*

11:00-12:15 **Yuan-Ming Lu** (Ohio State Univ.) Measuring symmetry fractionalization in quantum spin liquids

12:15-14:00 *Lunch*

14:00-15:15 **Yin-Chen He** (Harvard Uni.) Kagome spin liquid

## Week 3

### Jul. 17 (SET Day)

09:00-10:15 **Yang Qi** (MIT) The folding trick for topological orders enriched by the mirror symmetry

10:15-11:00 *Tea Break*

11:00-12:15 **Meng Cheng** (Yale Univ.) Anomalies in two-dimensional symmetry-enriched topological phases

12:15-14:00	<i>Lunch</i>	
14:00-15:15	<b>Haruki Watanabe</b> (Univ. of Tokyo)	Complete Theory of Symmetry-based Indicators of Band Topology

### Jul. 18 (QSL Day)

09:00-10:15	<b>Zheng-Xin Liu</b> (Renmin Univ.)	Quantum spin liquid states on Honeycomb lattice with Dirac spinons
10:15-11:00	<i>Tea Break</i>	
11:00-12:15	<b>Jin-Sheng Wen</b> (Nanjing Univ.)	Investigations on $\alpha$ -RuCl <sub>3</sub> , a material proximate to the Kitaev quantum spin liquid
12:15-14:00	<i>Lunch</i>	
14:00-15:15	<b>Gang Chen</b> (Fudan Univ.)	Theoretical Progress in Kitaev Materials, Pyrochlore Iridates, and Quantum Spin Ice

### Jul. 19 (TSC Day)

09:00-10:15	<b>Guo-Qing Zheng</b> (Okayama Uni.)	Quest for topological superconductivity
10:15-11:00	<i>Tea Break</i>	
11:00-12:15	<b>Yu-Xuan Wang</b> (UIUC)	Topological phase transitions in multi-component superconductors

### Jul. 20

09:00-10:15	<b>Adam Nahum</b> (Oxford)	Emergent SO(5) symmetry and dualities at deconfined critical points
10:15-11:00	<i>Tea Break</i>	
11:00-12:15	<b>Nic Shannon</b> (Okinawa Inst. of Sci. and Tech.)	Frustrating quantum spin ice
12:15-14:00	<i>Lunch</i>	
14:00-15:15	<b>Wei-Qiang Yu</b> (Renmin Univ.)	Pressure-induced and field-induced Magnetically Disordered State of $\alpha$ -RuCl <sub>3</sub> Evidenced by NMR

### Jul. 21

09:00-10:15	<b>Dong-Ning Sheng</b> (California State Univ., Northridge)	Possible Nematic Spin Liquid in Spin- \$1\$ Antiferromagnetic System on the Square Lattice: Implication for the Nematic Paramagnetic State of FeSe
10:15-11:00	<i>Tea Break</i>	
11:00-12:15	<b>Hong-Hao Tu</b> (Ludwig-Maximilians- University Munich)	Universal entropy of conformal critical points on a Klein bottle
12:15-14:00	<i>Lunch</i>	
14:00-15:15	<b>Jeffery Teo</b> (Virginia Univ.)	Between topological strings and topological phases

## Contact List

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**Note:** The contact information is provided for the convenience of attendees to collaborate and keep in touch. This information should not be shared with non-registered attendees and please respect the privacy of other attendees by not compiling this list for the purpose of sending unsolicited emails, or by sharing personal information without approval. Thank you.

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