

Telluride science workshop: Enhanced functionalities in 4 and 5d transition metal compounds from large spin-orbit coupling

June 14-18, 2015. Telluride Elementary School at 447 West Columbia Ave

Organizers: Sang-Wook Cheong (Rutgers), Gang Cao (Kentucky), and Jan Musfeldt (Tennessee)

TSRC Host: Executive Director Mark Kozak (970) 708-4426 mark@telluridescience.org

Time Sunday June 14: Chalcogenides and irridates

8:00-8:30	Registration and breakfast at TSRC for participants
8:30-8:45	Welcome and announcements
8:45-9:15	Tellurides in Telluride - Sang Cheong (Rutgers)
9:15-9:45	Dimerization in IrTe ₂ : Fermi surface reconstruction, and switchable spin polarization of electronic bands - Valery Kiryukhin (Rutgers)
9:45-10:15	Optical properties of IrTe ₂ - Dip Mazumdar (Southern Illinois)
10:15-10:45	Break
10:45-11:15	J = 1/2 physics of Ir-oxides: topological phase transition and effective magnetic interactions - Jaejun Yu (Seoul National)
11:15-11:45	Spin-orbit tuned ground states in iridates - Gang Cao (Kentucky)
11:14-12:15	Recent neutron studies on Ru- and Ir-based magnets - Jeff Lynn (NIST)
12:15-12:45	Evidence for Kitaev physics in alpha-RuCl ₃ - Steve Nagler (ORNL)

Monday June 15: Spin-orbit coupling trends in chalcogenides, oxides, silicides, and organics

8:00-8:30	Breakfast at TSRC for participants
8:30-9:00	5d transition metal oxides and chalcogenides - exotic magnetism, superconductivity and spin-orbit coupling - Hide Takagi (Tokyo)
9:00-9:30	Orbital-selective dimers and suppression of double exchange in 4d and 5d compounds - Daniel Khomskii (Koln)
9:30-10:00	Topological Crystalline Metal in Perovskite Iridates - Hae Young Kee (Toronto)
10:00-10:30	Break
10:30-11:00	Two-fold enhancement of the hidden-order/large-moment antiferromagnetic phase boundary in URu ₂ -xTxSi ₂ - Brian Maple (San Diego)
11:00-11:30	Novel transport and magnetic phenomena in strongly spin-orbit coupled materials - James Analytis (Berkeley)
11:30-12:00	Inhomogeneous superconductivity In organic superconductors and the role of spin-orbit scattering - Chuck Agosta (Clark)
6:30 PM	Group dinner at Rustico, Telluride

Tuesday June 16: Frustration + Multiferroics

8:00-8:30	Breakfast at TSRC for participants
8:30-9:00	Magnetism, metallicity, and topology in pyrochlore irridates - David Vanderbilt (Rutgers)
9:00-9:30	Triangular quantum spin nematics - Ribhu Kaul (Kentucky)
9:30-10:00	Frustration in square lattice of Jeff = 1/2 moments at high pressure - Daniel Haskel (Argonne)
10:00-10:30	Magnetic and multiferroic properties of Sr ₃ NiIrO ₆ and family members - Vivien Zapf (Los Alamos)
10:30-11:00	Break
11:00-11:30	Hidden antiferromagnetic order in strain-disordered multiferroic BiMnO ₃ - Art Hebard (UF)
11:30-12:00	Interplay of spin-orbit coupling, octahedral rotations, and dimensionality in perovskite iridates - Kyle Shen (Cornell)
12:00-12:30	Frustration, magnetization steps and record coercive fields in antiferromagnets in pulsed magnetic fields - John Singleton (LANL)

6:00-7:15PM TSRC Town talks at the Telluride Conference Center, Mountain Village

7:30-9:00PM Discussion Session -Telluride Elementary School - Daniel Khomskii and Hide Takagi

Wednesday, June 17: Chalcogenides + novel magnetism

8:00-8:30	Breakfast at TSRC for participants
8:30-9:00	Competing charge orders, domains walls, and electron correlation in IrTe ₂ and TaS ₂ - Han Woong Yeom (POSTEC)
9:00-9:30	Single- and multi-wall WS ₂ nanotubes: synthesis and optoelectronic properties - Alla Zak (HIT)
9:30-10:00	Controlling spin-orbit splitting by external factors in transition metal dichalcogenides - Thomas Heine (Jacobs)
10:00-10:30	Valleytronics - David Mandrus (Tennessee/ORNL)
10:30-11:00	Break
11:00-11:30	Spin-orbit mediated anisotropic exchange in organic magnets containing heavy heteroatoms - Steve Hill (FSU-NHMFL)
11:30-12:00	Muons and a local perspective on 4- and 5d electrons - Steve Blundell (Oxford)
12:00-12:30	High performance perovskite based photovoltaic cells - Ziruo Hong (UCLA)

6:00-9:00PM TSRC picnic at the Telluride elementary school (447 West Columbia Ave)

Thursday, June 18: Real space imaging and phase diagrams

8:00-8:30	Breakfast at TSRC for participants
8:00-8:30	Multidimensional scanning probe microscopy with species-selective atomic resolution imaging - Udo Schwaz (Yale)
8:30-9:00	Microscopic view of chemical dopants in Sr ₂ IrO ₄ - Abhay Pasupathy (Columbia)
9:00-9:30	Thermodynamics of interacting multiple order parameters - Pradeep Kumar (Florida)
9:30-10:00	Spectroscopy of heavy chalcogenides - Jan Musfeldt (Tennessee)
10:00-10:30	Wrap-up discussion - David Vanderbilt (Rutgers)
10:30-11:00	Break

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