

Hampton Inn Oceanfront

Jacksonville Beach, Florida

December 16 – 20, 2019

Organizers:

J.T. Haraldsen, University of North Florida A.V. Balatsky, Nordic Institute for Theoretical Physics

Loraine Morgan, University of North Florida Aditi Mahabir, University of North Florida

We are thankful for the support from the

University of North Florida

UNF Physics Department

UNF Academic Affairs

UNF College of Arts and Sciences

UNF Materials Science and Engineering Research Facility

Institute for Materials Science at Los Alamos National

Laboratory

National High Magnetic Field Laboratory

and

Nordic Institute for Theoretical Physics



Thank you all for presenting and attending this workshop. We have a wonderful representation of people from around the United States and the world.









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Physics College of Arts and Sciences

Condensed Matter Research in

Nanoelectronics Nanophotonics Optical Properties Epitaxial growth of Oxides Magnetic properties Solid state sensors



In this conference, the recent developments in the dynamic new and exciting field of quantum matter will be showcased. At this conference, key researchers active in a broad range of topics will come together and provide the latest details into the realization of these materials. Overall, the goal of this workshop is to bring together researchers from all over the globe to discuss and highlight emerging topics and ideas that help drive our understanding of quantum matter and that are stimulating the growth of Dynamic Dirac Quantum Matter.



Dirac Points have 4-fold symmetry, may be gapped by disorder or spin-orbital coupling Weyl Points have 2-fold symmetry, can only be annihilated by a Weyl point of opposite Berry curvature.

Dynamic Dirac Quantum Matter



Monday, December 16

8:00 a.m. – Registration in Lobby

Session I (Chair: Jason T. Haraldsen) – White Sands Room

8:45 – 9:00 a.m. – Welcome and Introduction – Jason T. Haraldsen

9:00 – 9:45 a.m. – Alexander Balatsky – Dynamic quantum matter and materials informatics

9:45 – 10:30 a.m. – Kevin Bedell – Landau Fermi liquid description of collective modes in 3D Dirac materials

10:30 – 10:45 a.m. – Coffee Break

10:45 – 11:30 a.m. – Rohit Prasankumar – Shedding new light on Dirac materials with ultrashort terahertz pulses

11:30 – 12:00 p.m. – Erik Henriksen – Cyclotron resonance spectroscopy of symmetry broken states in monolayer graphene

12:00 – 1:00 p.m. – Lunch – Outside Patio

1:00 – 2:30 p.m. – Open Time

Session II (Chair: Alexander Balatsky) – White Sands Room

2:30 – 3:15 p.m. – Jed Pixley – Incommensurate transitions and disorder in twisted bilayer graphene

3:15 – 4:00 p.m. – Zhoushen Huang – Floquet dynamics under spatially inhomogeneous drive

4:00 – 4:15 p.m. – Coffee Break

4:15 – 5:00 p.m. – Pier Coleman – Order Fractionalization

5:00 – 5:30 p.m. – Arun Paramekanti – Dirac magnons in an XY magnet

6:00 – 6:30 p.m. – Reception – Outside Patio

6:30 – 8:30 p.m. – Dinner – Outside Patio

7:00 – 8:30 p.m. – Poster Session (White Sands Room) and Astronomy Night (Weather Permitting)

Tuesday, December 17

8:00 a.m. – Registration in Lobby

Session III (Chair: Filip Ronning) – White Sands Room

9:00 – 9:45 a.m. – Peter Hirschfeld – Ultranodal pair states in ironbased superconductors

9:45 – 10:30 a.m. – Robert Konik – Anomalous Thermalization in Non-Integrable Systems: Rare States and Lack of Heating Under a Drive

10:30 - 10:45 a.m. - Coffee Break

10:45 – 11:30 a.m. – Alexei Tsvelick – Superconductor-metal transition in pair density wave superconductor in magnetic field

11:30 – 11:42 a.m. – Vladmir Zyuzin – Odd-frequency pairing in disordered conductors

11:42 – 11:54 a.m. – Pavlo Suchachov – Odd-frequency Berezinskii superconductivity in Dirac semimetals and its manifestation in optical response

12:00 – 1:00 p.m. – Lunch – Outside Patio

1:00 – 2:30 p.m. – Open Time

Session IV (Chair: Philip Hofmann) – White Sands Room

2:30 – 3:15 p.m. – Jose Mendoza-Cortes – First-principles studies of carbon: periodic table and possible superconductivity

3:15 – 4:00 p.m. – Jian-Xin Zhu – Nonequilibrium quasiparticle dynamics in an unconventional superconductor with competing order

4:00 – 4:15 p.m. – Coffee Break

4:15 – 5:00 p.m. – Peter Wahl – Surface states of correlated materials: From Fermi liquids to model systems for quantum criticality

5:00 – 5:12 p.m. – Davide Curcio – Time resolved X-ray photoelectron diffraction of graphene on SiC

5:12 – 5:24 p.m. – Charlotte Sanders – Role of matrix elements in observation of valley-selective linear dichroism in bilayer MoS₂

5:24 – 5:36 p.m. – Bart Olsthoorn – High throughput analysis of materials data with machine learning

5:36 – 5:48 p.m. – Yixing Fu – Magic-angle semimetals

6:00 p.m. – Dinner on own

Wednesday, December 18 Session V (Chair: Peter Wahl) – White Sands Room

9:00 – 9:45 a.m. – Chris Hooley – Mixed-parity superconductivity near Lifshitz transitions in strongly spin-orbit-coupled metals

9:45 – 10:30 a.m. – Fillip Ronning – F is for correlated topology

10:30 – 10:45 a.m. – Coffee Break

10:45 – 11:30 a.m. – Phillip Hofmann – In-operando photoemission spectroscopy on a graphene device

11:30 – 12:00 p.m. – Yafis Barlas - Quantum parity hall effect in ABA trilayer graphene

12:00 – 1:00 p.m. – Lunch – TBD

1:00 – 2:30 p.m. – Open Time

Session VI (Chair: Kevin Bedell) – White Sands Room

2:30 – 3:15 p.m. – Henrik Ronnow – Dirac triplet dispersion and a variety of other interesting phenomena in the Shastry-Sutherland compound SrCu₂(BO₃)₂

3:15 – 4:00 p.m. – Carlos Trallero - TBD

4:00 – 4:15 p.m. – Coffee Break

4:15 – 5:00 p.m. – Gayanath Fernando – Quasi-two-dimensional organics and possible time symmetry breaking in Hubbard ladders

5:00 – 5:30 p.m. – Alvaro Diaz Fernandez – Floquet engineering of Dirac cones on the surface of a topological insulator

6:00 – 6:30 p.m. – Reception – TBD

6:30 – 8:30 p.m. – Dinner – TBD

Thursday, December 19

9:00 – 12:00 p.m. – Topic-Focused Round Table Discussions

12:00 – 2:00 p.m. – Lunch on own

1:00 – 2:00 p.m. – Tour of UNF Physics Department and MSERF (Materials Science and Engineering Research Facility) – The van leaves at 12:40 p.m. and returns at 2:20 p.m.

2:00 – 5:00 p.m. – Topic-Focused Round Table Discussions

5:00 p.m. – Dinner on own

Friday, December 20

9:00 – 12:00 p.m. – Topic-Focused Round Table Discussions

12:00 – 2:00 p.m. – Lunch on own

2:00 – 5:00 p.m. – Topic-Focused Round Table Discussions

5:00 p.m. – Dinner on own

Saturday, December 21 11:00 am – Check out

Lunch and Dinner Venues

(Accessible by foot)



Electronic Structure Sudoku