



## KITP Conference: Turbulence in the Universe

(Feb 20-23, 2024)

Coordinators: Axel Brandenburg, Gregory Howes, Sasha Tchekhovskoy and Siyao Xu

### Tuesday, Feb 20, 2024

ISM, Chair: Axel Brandenburg (Nordita)

8:50am Lisa Stewart (KITP)  
9:00am Susan Clark (Stanford)  
9:30am Christoph Federrath (Mt. Stromlo Obs.)  
10:00am Alexei Kritsuk (UCSD)  
10:30am

Welcome[Video]  
Magnetic fields in the multi-phase interstellar medium[Slides][Video]  
The link between turbulence and star formation[Slides][Video]  
On statistical signatures of ISM turbulence in dust polarization maps[Slides][Video]

Morning Break

11:00am Mordecai-Mark Mac Low (AMNH)  
11:30am Ethan Vishniac (Johns Hopkins)  
12:30pm

Supernova Driven Galactic Dynamos[Slides][Video]  
Discussion led by Ethan Vishniac[Video]

Lunch Break

ISM, Chair: Siyao Xu (Florida)

2:00pm Eve Ostriker (Princeton)  
2:30pm Lachlan Lancaster (Columbia)  
3:00pm Dmitri Pogosyan (U. Alberta)  
3:30pm

ISM turbulence, then and now[Slides][Video]  
The Theory and Simulation of Wind Blown Bubbles[Video]  
Differential Measures for Magnetic Field Strength in Turbulent[Slides][Video]

Afternoon Break

4:00pm Peng Oh (UCSB)  
4:30pm Norman Murray (CITA)  
5:30pm

Multi-Phase Turbulence: the interaction between radiative cooling and turbulence[Slides][Video]  
Discussion led by Norman Murray[Video]

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### Wednesday, Feb 21, 2024

Galaxies, CGM and CRs, Chair: Drummond Fielding (Flatiron)

9:00am Irina Zhuravleva (U. Chicago)  
9:30am Yuanyuan Su (Kentucky)  
10:00am Rajsekhar Mohapatra (Princeton)  
10:30am

Turbulence in the Intracluster Medium: Observations, Challenges, and Future Perspectives[Video]  
Multiphase gas observed in various environments and what is the role of turbulence[Video]  
Multiphase condensation in galactic and cluster halos: the role played by turbulence[Slides][Video]

Morning Break

11:00am Mateusz Ruszkowski (Michigan)  
12:00pm Philipp Kempfski (Princeton)  
12:30pm

Discussion led by Mateusz Ruszkowski: Open problems in cosmic ray feedback[Video]  
Do cosmic rays care about the intermittency of interstellar turbulence?[Video]

Lunch Break

Galaxies, CGM and CRs, Chair: Sasha Tchekhovskoy (Northwestern)

2:00pm Claude-Andre Faucher-Giguere (Northwestern)  
2:30pm Philipp Grete (U Hamburg)  
3:00pm Philipp Moesta (U Amsterdam)  
3:30pm

The Turbulent Lives of Young Galaxies[Slides][Video]  
MHD turbulence from idealized boxes to the ICM[Slides][Video]  
Magnetoturbulence in supernovae and neutron-star mergers[Video]

Afternoon Break

4:00pm All participants  
4:30pm  
5:30pm

Lightning talks[Video]  
Poster session

RECEPTION

6:00pm

SPECIAL EVENTS DINNER

8:00pm

SHUTTLE TO BWSCI

### Thursday, Feb 22, 2024

Clusters, MHD, Heliosphere, Chair: Luca Comisso (Columbia)

9:00am Elisabete M. de Gouveia Dal Pino (U de Sao Paulo)  
9:30am Martin Lemoine (IAP-UPMC)  
10:00am Hui Li (LANL)  
10:30am

Turbulence-Driven Magnetic Reconnection and Cosmic Ray Acceleration[Slides][Video]  
Particle acceleration and transport in magnetized turbulence: a role for structures[Slides][Video]  
Temporal Properties of Compressible MHD Turbulence and Implications for Helio and Astro Plasmas[Slides][Video]

Morning Break

11:00am Alex Lazarian (UW-Madison)  
11:30am Megan Donahue (MSU)  
Hsiao Wen Chen (U. Chicago)  
12:30pm

Physics of Turbulent Acceleration and its Application to Galaxy Clusters[Video]  
Discussion led by Megan Donahue (MSU) and Hsiao-Wen Chen (U. Chicago): Observable implications of turbulence and pressure support on the CGM and ICM[Video]

Lunch Break

Clusters, MHD, Heliosphere, Chair: Greg Howes (Iowa)

2:00pm Trevor Bowen (UCB)

Mediation of collisionless turbulent dissipation through cyclotron resonance[Video]

2:30pm Mihailo Martinovic (Arizona)  
3:00pm Anna Tenerani (Texas)  
3:30pm

Ion-Driven Instabilities in the Inner Heliosphere; An Overview[[Slides](#)][[Video](#)]  
Switchbacks in the solar wind: turbulence or coherent waves?[[Slides](#)][[Video](#)]  
**Afternoon Break**

4:00pm Kris Klein (Arizona)  
4:30pm Greg Howes (Iowa)

The Nature of Turbulence in Space Plasmas[[Slides](#)][[Video](#)]  
Discussion led by Greg Howes: Kinetic Mechanisms for the Dissipation of Turbulence and their Dependence on the Turbulence Parameters[[Video](#)]

5:30pm

**RECEPTION**

6:00pm

**SPECIAL EVENTS DINNER**

8:00pm

**SHUTTLE TO BWSCI**

### **Friday, Feb 23, 2024**

#### **Black Holes, Jets and Disks, Chair: Yuan Li (North Texas)**

9:00am Omer Blaes (UCSB)

Convection, MRI and magnetic elevation in high luminosity accretion disks around supermassive black holes[[Slides](#)][[Video](#)]

9:30am Christopher Reynolds (Maryland)

Variability, dynamos and large-scale field growth in simplified models of black hole accretion disks[[Video](#)]

10:00am Goni Halevi (Northwestern)

Begin at the beginning: how black holes are born, launch jets and tidally disrupt stars[[Video](#)]

10:30am

**Morning Break**

11:00am Jim Stone (IAS)

Turbulence in radiation-dominated disks[[Slides](#)][[Video](#)]

11:30am James Beattie (Princeton / CITA)

A Large Compressible MHD Turbulence Simulation (with no net magnetic flux)[[Video](#)]

12:00pm Yue Hu (UW Madison)

Magnetic Fields in Galaxy Clusters: Insights from Synchrotron and X-Ray Intensity Gradients[[Slides](#)][[Video](#)]

12:30pm

**Lunch Break**

#### **Collisionless Plasmas, Chair: Philipp Kempski (Princeton)**

2:00pm Deepika Bollimpalli (Northwestern)

Disc wars: The thin disc strikes back[[Video](#)]

2:30pm Luca Comisso (Columbia)

Particle acceleration in magnetized plasma turbulence[[Slides](#)][[Video](#)]

3:00pm Vladimir Zhdankin (UW-Madison)

Turbulence and instabilities in collisionless accretion flows[[Video](#)]

3:30pm

**Afternoon Break**

4:00pm Mehrnoosh Tahani (Stanford)

MHD turbulence: What the 3D magnetic field observations are revealing[[Slides](#)][[Video](#)]

4:30pm Eliot Quataert (Princeton)

Discussion led by Eliot Quataert[[Video](#)]

5:30pm **CONFERENCE END SHUTTLE TO BWSCI** \*Also available to SB Airport and SB Airbus, Goleta location.(See Registration Desk BEFORE FRIDAY to sign up.)