Physics Colloquium

Prof. Michael Lisa
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"Subatomic Swirls: Ultra-relativistic Nuclear Collisions and Nature's Most Vortical Fluid"

Ultra-relativistic collisions between heavy nuclei produce the quark-gluon plasma (QGP), a unique state of matter that characterized the early universe for the first few microseconds after the Big Bang. Among the most surprising early results from the Relativistic Heavy Ion Collider (RHIC) was the discovery that the QGP is a fluid with remarkable properties, and a hydrodynamic treatment is now the standard paradigm in probing the bulk properties of nuclear collisions. Recently, the STAR Collaboration at RHIC announced the discovery of global hyperon polarization in heavy ion collisions. This polarization may be used to extract the rotational substructure of the fluid flow field. The result represents a striking validation of the near-equilibrium hydrodynamic paradigm and establishes the quark-gluon plasma at RHIC as by far the most vortical fluid in Nature. I will discuss some of the intense activity in the field, sparked by the discovery of QGP vorticity. In addition to the rotational fluid substructure, these measurements are sensitive to the extreme magnetic fields expected in heavy ion collisions. A quantitative understanding of these fields is one of the most important issues in the field of heavy ion physics today.

Mike Lisa earned his Ph.D. from Michigan State University in 1993, studying heavy ion collisions at the NSCL cyclotron lab. While a postdoc at Lawrence Berkeley Lab, he turned his attention to the higher energies available at the LBL Bevalac facility. In 1996, Lisa joined the faculty of the Ohio State University, where he continues experimental studies at RHIC and the LHC. Currently, his primary focus is on the RHIC Beam Energy Scan in order to search for non-trivial structures on the QCD phase diagram. He has recently begun a research thrust in digital intensity interferometry with the VERITAS telescope array.

Prof. Lisa is the recipient of the Sambamurti Memorial Lectureship, is an Ohio State University Distinguished Scholar, a Fulbright Scholar, and an APS Fellow. He has served on the Nuclear Science Advisory Committee (NSAC), the RHIC User's Executive Committee, and numerous NSF and DOE subcommittees. He has co-authored more than 650 publications, has given more than 150 research presentations, and has authored an undergraduate physics textbook.

Tuesday, September 7 in LL 316 at 4:30

For Zoom participation, please see information below:

Meeting ID: 972 1274 7894

Passcode: 631869