

**University of Wisconsin-Milwaukee**

**Dept. of Physics  
COLLOQUIUM**

*The Ugly Duckling and the Swan:  
The Quark-Gluon Plasma and  
Heavy Ion Collisions*

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**Friday, 26 April 2024**

**3:30 PM (start)      KIRC 1150**

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I give a pedagogical and historical overview of the search for the Quark-Gluon plasma (QGP) in the collisions of heavy ions. I begin with a brief review of why we expect a QGP to be formed at high temperature. In this, numerical simulations in lattice Quantum ChromoDynamics (QCD) form the bedrock of the field. In particular, they demonstrate the relationship between deconfinement and the restoration of chiral symmetry.

At the SPS at CERN, I discuss the suppression of J/Psi mesons, and the excess of dileptons below the rho meson. Bjorken first noticed that a "plateau" may emerge at high energies, and produce a regime at high temperature, and low chemical potential. At colliders such as RHIC, at Brookhaven, and the LHC, at CERN, I discuss two notable signals: the utility of nearly ideal hydrodynamics, and jet quenching. The new frontier is going down to moderate collision energies, which there is net excess of baryons. Possible phenomena in this region include a critical end point and moat regimes.

