The phase diagram of strong nuclear forces is the only phase diagram of the Standard Model of elementary particles that can be studied in the laboratory. This can be done via colliding nuclei at relativistic energies. The electroweak phase transition would require energy densities roughly 8 to 9 orders of magnitude larger than those needed to study phase transitions related to strong nuclear force and are not accessible in terrestrial conditions. By colliding nuclei at relativistic energies, we aim to understand the nature of the matter that existed a few microseconds after the Big Bang when temperatures were too high for hadrons to emerge as relevant degrees of freedom. Collisions allow us to deposit enough energy into a small enough region to create a new form of matter: a quark-gluon plasma (QGP). Over the last decade, we collected a convincing body of evidence that this new state of nuclear matter has been indeed formed. As such, this may be a unique era in the study of the phases of the early universe: an era when an investigated phase is actually recreated in a laboratory setting. I will discuss the challenges and new ideas on how we can learn more about the phase diagram of nuclear matter by performing collisions of heavy nuclei.

Friday November 1, 2019
2:00 PM
DeLoach Hall, Room 212

Refreshments Will Be Served