

Wednesday, March 1st, 2023

Colloquium from 3:30 PM – 4:30 PM in **GWC 487**

The Chiral Universe

Professor Stephon Alexander

Brown University



Abstract:

Among a handful of mysteries in the standard model of cosmology, I focus on three: Dark Matter, Baryogenesis and the origin of cosmic structure. I then provide a pedagogical introduction to Chiral Gravity and show how these three mysteries may be interconnected. I also discuss some observational windows including parity violation in large scale distribution of galaxies and chiral dark matter.

Biography:

Stephon Alexander is a theoretical and computational physicist, and author whose work is at the interface between cosmology, particle physics, quantum gravity and music technology. His expertise lays in constructing new theories and models of the early universe that has predictions for the universe at present, such as dark energy and dark matter.

Alexander is a Professor of Physics at Brown University, and a past President of the National Society of Black Physicists. Alexander is also the Executive Director of the Harlem Gallery of Science. He had previous appointments at Stanford University, Imperial College, Penn State, Dartmouth College and Haverford College. Alexander is a specialist in the field of string theory and cosmology, where the physics of superstrings are applied to address longstanding questions in cosmology. In 2001, he co-invented the model of inflation based on higher dimensional hypersurfaces in string theory called D-Branes. In such models the early universe emerged from the destruction of a higher dimensional D-brane which ignites a period of rapid expansion of space often referred to as cosmic inflation.

In his critically acclaimed book, *The Jazz of Physics*, Alexander revisits the ancient interconnection between music and the evolution of astrophysics and the laws of motion. He explores new ways music, in particular jazz music, mirrors modern physics, such as quantum mechanics, general relativity, and the physics of the early universe. He also discusses ways that innovations in physics have been and can be inspired from "improvisational logic" exemplified in Jazz performance and practice. Alexander is also a professional touring jazz musician.

Host: Prof. Cindy Keeler

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