SEMINAR IN PHYSICS

Friday, March 30, 2018
3:30-4:25 – Ross 0220

· Refreshments ·

Dr. Nils Halverson

Chair, Department of Astrophysical & Planetary Sciences
The University of Colorado

Looking Back at the Big Bang

Ancient light, detectable by modern microwave telescopes, allows us to take images of the Universe in its infancy and reveals clues about our ultimate origin. Since its discovery in 1964 by a pair of radio astronomers, this light, called the Cosmic Microwave Background (CMB), has revealed a wealth of information about the early Universe, and is one of the major pillars of evidence for the Big Bang.

Currently, observations of the CMB are being used to test a theory called "Inflation" which postulates that the Universe underwent a period of rapid expansion a fraction of a second after birth, seeding the Universe with the first hints of structure that later grew into stars, galaxies, and clusters of galaxies, and the filaments in between that are known as the "cosmic web." Inflation is also predicted to have launched gravitational waves, ripples propagating in the fabric of spacetime that would have imprinted a subtle curling pattern in the polarization of the CMB light, and the race is on to search for this signal from the first moments after the Big Bang.

I will review what observations of the CMB have told us about the history of the Universe and what they may yet reveal.

Dr. Halverson works in experimental cosmology, including observations of the Cosmic Microwave Background (CMB) and mm-wave instrumentation development efforts. His previous experience at Caltech, Chicago, and Berkeley has been in mm-wave studies of the CMB, including measurements of CMB temperature and polarization anisotropy with DASI (Degree Angular Scale Interferometer), and development of the APEX-SZ galaxy cluster survey instrument. His current interests include Sunyaev- Zel'dovich effect galaxy cluster surveys and fine scale CMB anisotropy measurements using the 12m APEX telescope (Chile/Atacama) and the 10m South Pole mm-wave Telescope.