

**CU Physics Department Colloquium**  
**Monday, April 30, 2007 4:10 PM 428 Pupin Hall**

*Physics and observational signatures of the first stars  
and the epoch of reionization*

The physics of the formation of first stars will be reviewed. The first stars formed in the first dark matter halos where gas was able to cool through molecular hydrogen lines. They were metal-free and highly massive, and produced HII regions which ionized and evaporated their entire host halos starting the process of reionization. They probably also formed the first black holes, which may have grown to the massive nuclear black holes that gave rise to quasars at a later epoch. Several observational probes to the epoch of reionization



and the first stars will be discussed: the Thomson optical depth and polarization fluctuations in the Cosmic Microwave Background, the Gunn-Peterson trough in high-redshift quasars, the possible production of gamma-ray bursts by the first stars and the intergalactic damped Lyman alpha absorption that could be observed in their spectra, the absorption of the Lyman alpha emission line in star-forming galaxies during reionization, and the 21 cm emission and absorption by intergalactic hydrogen.

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