Abstract Submitted
for the APR11 Meeting of
The American Physical Society

Cosmic Reionization and the End of the Dark Ages[1] PAUL R. SHAPIRO, Dep.of Astronomy and Texas Cosmology Center, The University of Texas at Austin — The first billion years of cosmic time witnessed the formation of the first galaxies and stars, whose UV radiation gradually burned through the surrounding intergalactic medium, transforming it from a cold, diffuse gas of neutral atoms to a 10,000 K hot gas of ions and electrons. This "epoch of reionization" (EOR) filled space with a patchwork quilt of giant ionized zones and neutral zones, until the ionized zones eventually grew to fill all of space. The EOR is one of the last unexplored windows of cosmic time subject to direct observation, and a crucial missing link in our astronomical confirmation of the current standard theory of cosmology, the Cold Dark Matter model. Towards that end, we have pioneered the large-scale numerical simulation of this phenomenon, to predict a host of observable consequences with which to test the theory, ranging from the redshifted cosmic 21cm background from hydrogen atoms in the neutral zones during the EOR, to the angular fluctuations of the cosmic microwave background introduced when those photons scatter off free electrons in the ionized zones, to the quenching of light from the earliest galaxies when their Lyman alpha emission lines resonantly scatter off the trace of neutral atoms left behind inside the ionized zones. I will report the latest developments.

[1]This work is supported by NSF, NASA, and the U.Texas TACC.

Paul R. Shapiro
Dep.of Astronomy and Texas Cosmology Center,
The University of Texas at Austin

Date submitted: 18 Jan 2011 Electronic form version 1.4