Abstract Submitted
for the APR17 Meeting of
The American Physical Society

Magnetizing the Universe during the Epoch of Reionization DAEGENE KOH, JOHN WISE, Georgia Inst of Tech — Magnetic fields are speculated to affect the collapse dynamics in early star formation to influence the IMF, which may be imprinted in the local metal-poor population. These fields arise by the amplification of primordial fields during the formation of the first (Pop III) and from their feedback. We study the former using MHD simulations with a uniform seed field from cosmological initial conditions to the formation and supernova of a Pop III star. We find that a weak seed field can be amplified to μG at the density peak and by a factor of 100 around the shell of the supernova shock. We also explored the dynamics of metal-poor mini-halos, enriched by Pop III supernova, in varying metallicities and Lyman-Werner flux to produce a fit for the minimum collapse mass. Furthermore, Pop III stars are significant drivers of reionization at high redshift (z>10). We use semi-numeric methods including Pop III stars as ionizing sources and find smaller characteristic HII bubbles sizes while calculating an optical depth, $\tau_e = 0.0569$, consistent with the latest results from Planck. The resulting ionization fields can efficiently model the ionizing UV background in cosmological simulations. These results are essential to building a full MHD simulation of the first galaxies.

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Date submitted: 30 Sep 2016 Electronic form version 1.4