

A continuing source of uncertainty for Epoch of Reionization (EoR) measurements is the degree to which polarized foregrounds (and imperfect accounting of the polarized response of the instrument) will contaminate the measurement of the unpolarized EoR signal. Measuring and characterizing polarized emission at low radio frequencies requires good models of

- the intrinsic polarized signal from extragalactic and Galactic sources, including both point (e.g., radio galaxies, pulsars) and diffuse (typically nearby polarized interstellar medium(ISM)),
- the rotation measure structure of the Galactic ISM
- the fully-polarized response of the antenna primary beam
- the ionosphere time and spatial variability

combined with the ability incorporate all of these effects into fully-polarized visibility simulation and calibration.

A number of software packages exist which individually address all of these challenges, for specific instruments, and under various assumptions. In this talk, I will briefly review the current state of knowledge and suite of tools available. Then I will discuss progress we have made in the specific case of HERA.

While HERA is not optimized for imaging, given the highly redundant array configuration, we have nevertheless made significant progress in modeling the full polarization response of the antenna and feed, and incorporating this into realistic simulations of the measured visibilities. We discuss the current difficulties with models of source emission (particularly as we extend to frequencies below 100 MHz) and rotation measure, and how we have incorporated the ionosphere (via a custom package) into our simulations. We also discuss success thus far with a custom calibration approach (based on Smirnov & Tasse 2015). We explore correcting for the primary beam using both an image-based, least-squares solution for the Stokes images, as well as deconvolution using tools from CASA.