## Progress Report

- **New Research:** (1) At UCLA, Furlanetto, Mirocha, and graduate student Richard Mebane submitted a paper describing a new semi-analytic model of the first generations of stars and galaxies. The model will form the foundation for predictions of the 21-cm radio signal we hope to observe from the Moon; (2) The Cosmic Twilight Polarimeter (CTP, see September report) engineering prototype has been deployed and preliminary observations are currently being conducted in search for the periodic projection-induced polarization from the foreground spectrum.
- **Papers:** Mebane, Mirocha & Furlanetto 2017, "The Persistence of Population III Star Formation," submitted to *MNRAS* (arXiv.org/1710.02528).
- **Meetings:** (1) MacDowall and Kasper attended the Parker Solar Probe/Solar Orbiter SWG (JHU APL) on Oct 2-6; (2) MacDowall presented on low frequency radio arrays from the lunar surface at LEAG (Columbia, MD) on Oct 10-12, and attended the *Back to the Moon* workshop on Oct 12-13 (Columbia, MD) and the Van Allen Probes SWG (JHU APL) on Oct 25-27; (3) Bowman presented results from EDGES at IAU333 on Oct 2.
- **Outreach:** Fiske planetarium, Sommers-Bausch Observatory and NESS at U. Colorado celebrated the International Observe the Moon Night on Oct 28. This event presented the full planetarium dome show [Back to the Moon for Good](#) followed by Q&A, and afterwards a visit to the observatory for a live viewing of the Moon.
- **Student Mentoring:** Graduate student Nivedita Mahesh from ASU produced simulations of the EDGES antenna beam that include perturbations in the field of view that mimic potential obstacles seen by a real antenna. These simulations are part of a study to quantify the effect of obstacles in the field of view on measurements of the global redshifted 21-cm line.
- **Visits/collaborations:** On Oct 19-20, the NESS team at CU hosted a visitor from UC Berkeley, graduate student Nicholas Kern, who gave a seminar talk and participated in discussions where he contributed his expertise on estimation of cosmological parameters from low-frequency measurements; on Oct 26, the CU team hosted chief exploration scientist for NASA HEOMD, Ben Bussey, whom our NESS team is working with to help plan a workshop on *Science from the Deep Space Gateway*.

Upcoming Events

- Burns will visit Puebla, Mexico to receive a Honorary Doctorate from the National Institute of Astrophysics, Optics & Electronics and give an invited talk entitled "Our Future in Space: Humans, Robots & Telescopes Exploring Together" on Nov 8.
- Fong will visit CU on Dec 12 for collaborative discussions about the work on telerobotics and its synergy with virtual reality for lunar exploration being currently developed at CU.
- MacDowall will represent NESS telerobotics at the Space Assembly & Servicing Workshop (GSFC) on Nov 1-3; MacDowall will also present on radio astronomy including NESS activities at the Jean-Louis Steinberg Memorial Conference (Meudon, France) on Nov 6-10.

Moment of Science
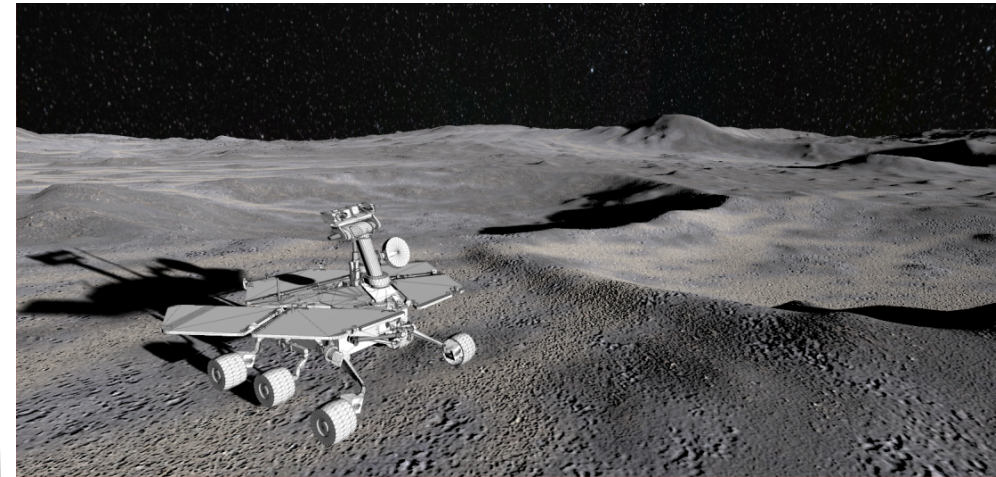
Note: this is a snapshot of the full video to be played at the report presentation.

Virtual rover and lunar surface as seen from a virtual reality head-mounted display. This experimental framework allows for 3rd and 1st person rover teleoperation for user studies, user training, and rapid prototyping of user interfaces and rover designs — all without the need of physical hardware. This is research by CU graduate student Michael Walker & NESS Collaborator Dan Szafir.

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