



SSSERVI Monthly Report

NESS/PI Burns - February, 2018



Progress Report

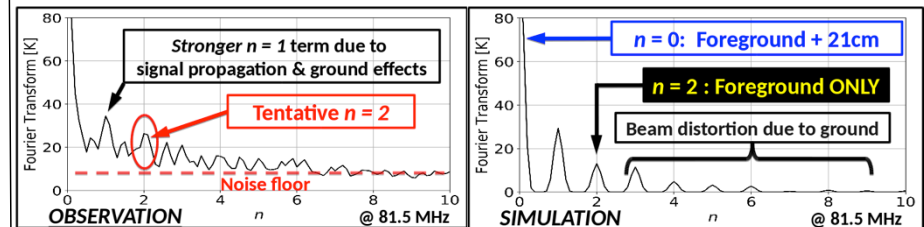
- **Paper:** Airapetian, ..., Hallinan et al., 2018, "Life Beyond the Solar System: Space Weather and Its Impact on Habitable Worlds", white paper submitted to the National Academy of Sciences in support of the Astrobiology Science Strategy for the Search for Life in the Universe.
- **Seminars:** (1) **Monsalve** presented an NRAO Colloquium in Socorro, NM on February 2 about "Illuminating the Cosmic Dawn with Sky-Average Radio Measurements". (2) **Burns** presented a lecture entitled "Our Future in Space: Humans, Robots, & Telescopes Exploring Together" at the Institute for Human & Machine Cognition, Pensacola, FL on February 22.
- **Organization:** **Burns** was part of the organizing committee for the *Deep Space Gateway Science Workshop* in Denver from February 27 to March 1 with 300 attendees.
- **Meetings:** a) Papers presented at the Aspen meeting on Cosmic Dawn: (1) **Burns** on "Extraction of the Global 21-cm Signal from Foregrounds Using Dynamic Polarimetry and Pattern Recognition", (2) **Tauscher** on "Using training sets and SVD to separate global 21-cm signal from foreground and instrument systematics", (3) **Bowman** on "Latest Results from EDGES", (4) **Mebane** on "The Persistence of Population III Star Formation", (5) **Monsalve** on "Constraints on the Global Redshifted 21-cm Signal with EDGES Data Over 90-190 MHz", (6) **Mirocha** on "Metrics for Disentangling PopII and PopIII Contributions to the 21-cm Background". b) Papers presented at the *DSG Science Workshop*: (1) **Tauscher** on "The Gateway to Cosmic Dawn: A Low Frequency Radio Telescope for the DSG"; **Mellinkoff** on "Operational Constraints of Low-Latency Telerobotics from the DSG Due to Limited Bandwidth"; **Walker** on "VR Simulation Testbed: Improving Surface Telerobotics for the DSG"; **Burns** on "Space Science and Exploration on the Lunar Farside Facilitated by Surface Telerobotics from the DSG"; **MacDowall** on "Importance of a Low Radio Frequency Interference Environment for the DSG"; **Monsalve** on "Telerobotic Deployment and Operation of a Lunar Farside Low Radio Frequency Cosmology Telescope from the DSG"; **Rapetti** on "Hydrogen Cosmology from the DSG: Data Analysis Pipeline for Low-Frequency Radio Telescopes"; **Bowman** on "Lunar Farside Radio Array Pathfinder Enabled by the DSG"; **Kring** on "Accessing the Lunar Farside and Facilitating Human-Assisted Sample Return

with the DSG"; **Cichan** on "Communications Relay and Human-Assisted Sample Return from the DSG"; **Kasper** on "Heliophysics Radio Observations Enabled by the DSG"; **Kring** on "DSG Support of Lunar Surface Ops and Tele-Operational Transfer of Surface Assets to the Next Landing Site"; **Fong** on "Telerobotics of Orbiting and Surface Assets".

Upcoming Events

(1) **MacDowall** will present at the *Triennial Earth-Sun Summit* in Leesburg, VA (May 20-24) on "Complex Type III radio bursts and Their Correlation with Solar Energetic Particle Events". (2) **Hegedus & Kasper** will present at the *TESS Forum* on the topic of lunar radio arrays applied to tracking Type II & III bursts out to .5 AU. They have 2 fluid MHD simulations that will inform radio emission models that will be propagated through different lunar radio array models.

Moment of Science:



Caption: Preliminary analysis of the Cosmic Twilight Polarimeter (CTP) Stokes Q data at 81.5 MHz (left panel) suggests a tentative detection on the second harmonic ($n=2$) corresponding to the modulated signature of the projection-induced polarization effect, as predicted by simulation (right panel). The $n=2$ component represents the twice diurnal nature of the modulation. This twice diurnal signal provides a direct constraint of the foreground synchrotron spectrum without the use of conventional logarithmic polynomial fit. The dynamical characteristic of this twice diurnal Stokes spectrum allows the foreground to be measured without confusion from the isotropic 21-cm background. Polarimetry is a key technology development for a lunar-based low radio frequency cosmology telescope. Research from CU grad student B. Nhan, Co-I Bradley, and Burns.

2/26/2018