



# SSERVI Monthly Report

## NESS/PI Burns - September, 2020



### Progress Report:

- Papers:** (1) "Formulating and critically examining the assumptions of global 21-cm signal analyses: How to avoid the false troughs that can appear in single spectrum fits", **Tauscher, Rapetti, Burns**, ApJ, 897, 132; (2) "Global 21 cm Signal Extraction from Foreground and Instrumental Effects. II. Efficient and Self-consistent Technique for Constraining Nonlinear Signal Models", **Rapetti, Tauscher, Mirocha, Burns**, ApJ, 897, 174; (3) "Global 21 cm Signal Extraction from Foreground and Instrumental Effects. III. Utilizing Drift-scan Time Dependence and Full Stokes Measurements", **Tauscher, Rapetti, Burns**, ApJ, 897, 175; (4) "Characterizing the Radio Quiet Region Behind the Lunar Farside for Low Radio Frequency Experiments", **Bassett, Rapetti, Burns, Tauscher, MacDowall**, Adv. Space Res., 66, 1265; (5) "A Flexible Analytic Model of Cosmic Variance in the First Billion Years", **Trapp, Furlanetto**, in press at MNRAS, arxiv: 2009.05059.
- News:** (1) [Why winning the new space race is so important for the USA](#), interview to **Burns** in The Telegraph; (2) [The history and future of telescopes on the Moon](#), article in Astronomy.com with quotes from **Burns**; (3) [Telescopes on the Moon](#) video sponsored by MagellanTV includes information about FARSIDE; (4) [Fly me to the moon, and far beyond](#) CU On The Air Podcast interviews **Burns**; (5) article in NRAO eNews on the [Dark Ages Polarimeter Pathfinder](#) by Hawkins & **Bradley**; (6) [NASA patented a faster, cheaper route to the moon. The first spacecraft to use it could make Nobel Prize-winning discoveries about the universe](#), article from Business Insider with quotes from **Burns**; (7) [NRAO Joins Space Mission to the Far Side of the Moon to Explore the Early Universe](#), NRAO press release about joining DAPPER; (8) [A Roadmap for Science on the Moon](#), article in CU Boulder Today with quotes from **Burns**.
- Awards:** (1) CU grad student **Bassett** obtained a high-pass in his Comprehensive II exam; (2) NESS Co-I **Bradley** received the NRAO Director's Distinguished Performance Award.
- Meetings:** (i) 236th Meeting of the American Astronomical Society, virtual, June 1-3, with NESS presentations by **Rapetti, Bassett, Tauscher, Burns, Hibbard** (iposter), Chen (Ping, **Falcke, Klein-Wolt**); (ii) NASA Exploration Science Forum 2020 (with **Rapetti** as one of the SOC chairs), virtual, July 8-10 with NESS presentations on: (1) "Are Non Co-located Linearly Polarized Antennas Advantageous for FARSIDE?" by **Mahesh** (iposter); (2) "Devising Robustness Tests for Lunar-based Global 21-cm Experiments" by **Bassett** (iposter); (3) "Earth Based Evaluation of Dynamic Polarimetry for Future Global 21-CM Cosmology Observations from the Moon" by **Bordenave**; (4) "FORWARD! Lunar Exploration and Beyond" by Keller; (5) "Global Neutral Hydrogen Data Analysis Pipeline for a Lunar-Based Satellite" by **Rapetti**; (6) "Implementing an Augmented Reality User Interface for Future Lunar Telerobotic Assembly

(Contd.) Experiments" by **Bell** (iposter); (7) "Measuring the 21-cm Global Signal from the Lunar Farside using Polarization and Time-dependence" by **Tauscher** (iposter); (8) "Mixed Reality Interfaces for the Moon and Beyond: Advancing Surface Telerobotic Interfaces in the NASA Artemis Program" by **Walker** (iposter); (9) "Modelling the Galactic Foreground and Beam Chromaticities for Lunar-Based Global 21-cm Experiments" by **Hibbard**; (10) "Status of the Radio Observations at Lunar Surface of Photoelectron Sheath Payload" by **MacDowall**; (11) "Transformative Astrophysics from the Farside of the Moon" by **Burns**.

### Upcoming events:

- Meeting:** 3<sup>rd</sup> Global 21cm Workshop, virtual (organized by the University of Cambridge, UK), October 19-22, with NESS talks by **Mahesh, Burns, Rapetti, Tauscher, Bassett, Hibbard**.

### Moment of Science:

## FARSIDE Mission Architecture (Frequencies: 100 kHz to 40 MHz)

