Basic Considerations for a Single-Antenna Global Experiment on the Surface of the Moon

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1. The following assumes an **EDGES-like instrument**, measuring below $\sim$100 MHz. The antenna diameter would be $\sim$3 m, and the metal ground plane diameter would be $\sim$30 m.

2. It also assumes that the antenna and electronics have been designed to **operate and survive the extreme temperature conditions** and changes.

3. Most of the **considerations relate to location and physical features** of the terrain.

1. **Assuming a zenith pointing, drift instrument:** What is the **best location/latitude** on the far side of the Moon to observe over **low foregrounds**, for significant amounts of time?

2. **Beam and loss characteristics depend on properties of physical "ground", below the ground plane:** What are the **electrical properties** (conductivity, relative permittivity, etc.) of the physical ground on the Moon?

3. **To avoid resonances, the metal ground plane has to rest on an even, smooth physical ground.** It is necessary to find such a **location**.

4. **Geological features at the horizon, i.e., "mountains", affect the measurement in the form of losses.** Extreme example: inside a crater. It is necessary to find a **location** with low horizon elevation.

5. **Ideally, electronics and measurement equipment should not be visible by the antenna.** Thus, it might be necessary to keep them below the antenna and ground plane. This could require **excavations**.

Extra slide:
Current EoR constraints from EDGES High-Band (90-190 MHz)