Contribution ID: **10** Type: **Oral presentation (20 minute)**

Channel Filtering to Reduce 1/f Noise Structure in SPHEREx Data

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The SPHEREx satellite will survey the full sky between 0.75 - 5.0 micron in over 100 wavelengths to study cosmic inflation, galaxy formation, and bionic ice distribution in the Milky Way. The focal plane assemblies consist of six HAWAII-2RG (H2RG) detectors equipped with linear variable filters (LVF) to vary the spectral response along one spatial direction with resolving power R = 35 to 130. The flight electronics processes the detector data into photocurrent during sampling-up-the-ramp and flag saturation and transients in real time. To meet the spatial 1/f noise requirement on large scales (5 –20 arcminutes), we monitor the amplifier voltage during an exposure to correct for their drift, apply non-sequential pixel sampling ("row chopping") to shift the noise to smaller scales, and increase visits to the optically dark ("reference") pixels to better estimate the detector channel's pedestal offsets. We find the reference pixels are not fully analogous to the optical pixels, so reference subtraction alone does not remove all the channel-to-channel noise. Channel median filtering improves the noise performance in dark exposures but is not effective in sky observation due to the diffuse sky emission, the LVF responses, and the source masking. We present here an improved version of the channel filtering to account for these effects.

contribution subject matter

noise characteristics

Keywords for your contribution subject matter (this will assist SOC in accurately characterizing your contribution)

H2RG, 1/f noise, spatial correlated noise, channel filtering, intensity mapping, SPHEREx

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