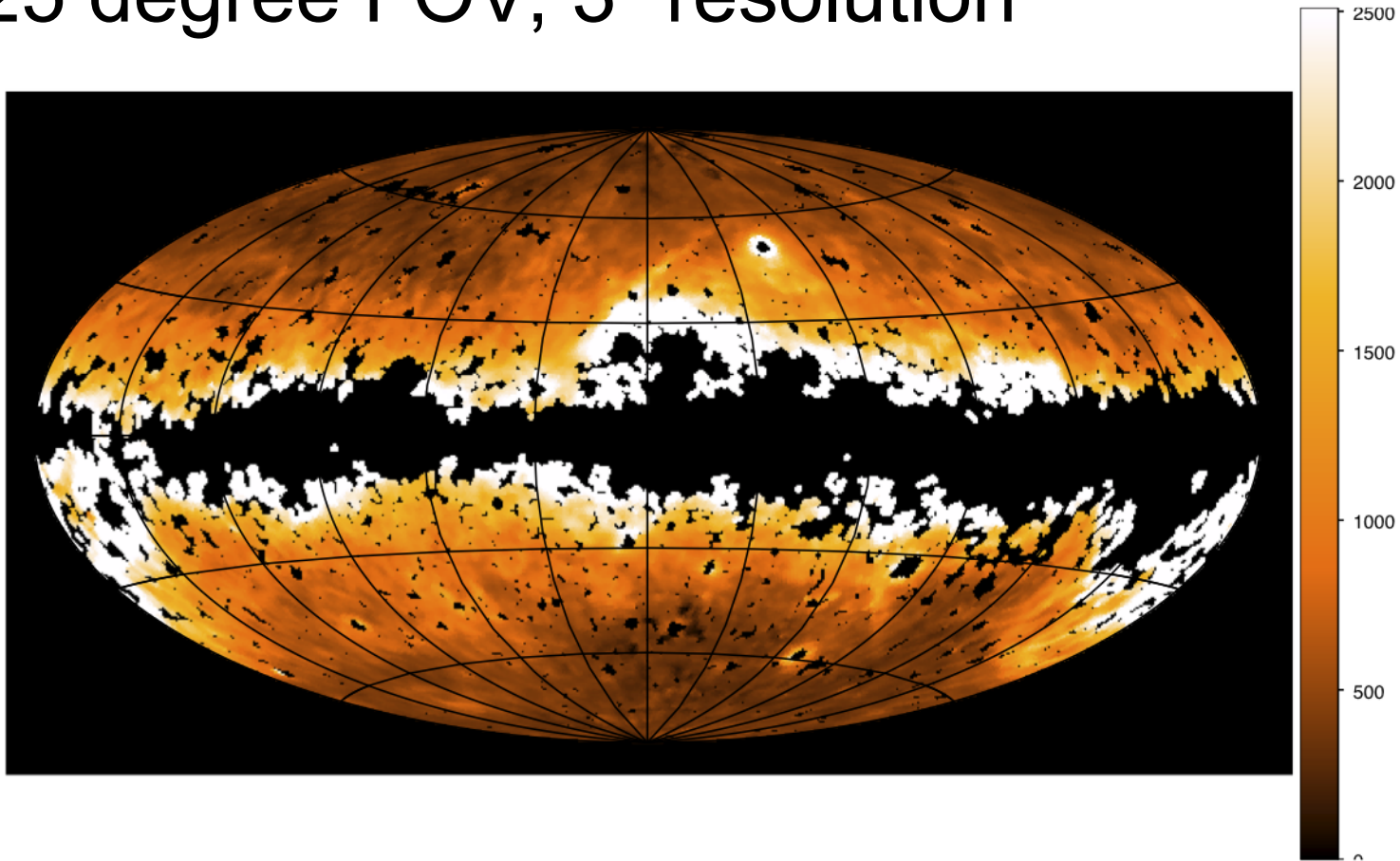


Challenges in wide field UV Astronomy

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GALEX

- 1.25 degree FOV; 3" resolution



Number of Pixels

- Typical off the shelf UV detector:
 - 40 mm with 25 micron pixels = 1600 resolution elements.
 - Optical resolution of 10 microns.
 - 1 degree field would give 2.25" pixels.
- Resolution should be matched to source density.

Count rate

- If we use photon counting detectors, total count rate can be no more than 10^5 counts/s.
- 14^{th} magnitude B0 star gives 10^4 counts/s in GALEX FUV (3×10^4 in NUV).
 - 10 cm mirror would cut rates by 25 (400 and 1000, respectively).
- Diffuse background of 1000 ph units gives rise to about 3500 counts/s in FUV and 2×10^4 in NUV.
- Lifetime constraint of $1\text{C}/\text{cm}^2$.

Dynamic Range

- If one uses a CCD, frame rate is on the order of 25 Hz so saturation occurs at 25 counts per second: lose photometric linearity at 17th magnitude for 10 cm mirror.
- Much better for photon counting detectors.
- Zero noise detectors so assume 10 photons in 1200 seconds: lower limit of 21st mag B0 star.
- Variability measurement requires statistical variation in specified time period.

Current Plans

- Build optics/structure to match space requirements.
- Use commercially available detectors (CCDs).
- Fly on balloon for observations of meteors/sprites.
- Not much money required.

In parallel

- Look for money from DST for UV program.
 - Funds required for:
 - Detector.
 - Bus.
 - Launch.

Summary

- Plan is to get started with something realistic.
- Modifications for a cheap space launch are not difficult.