

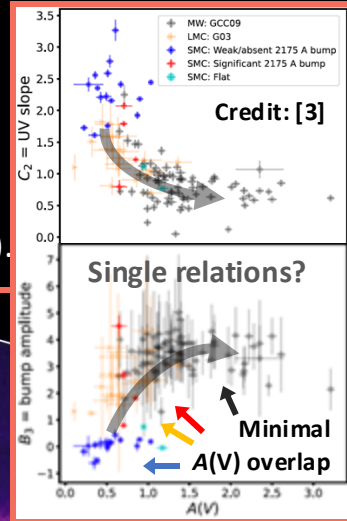
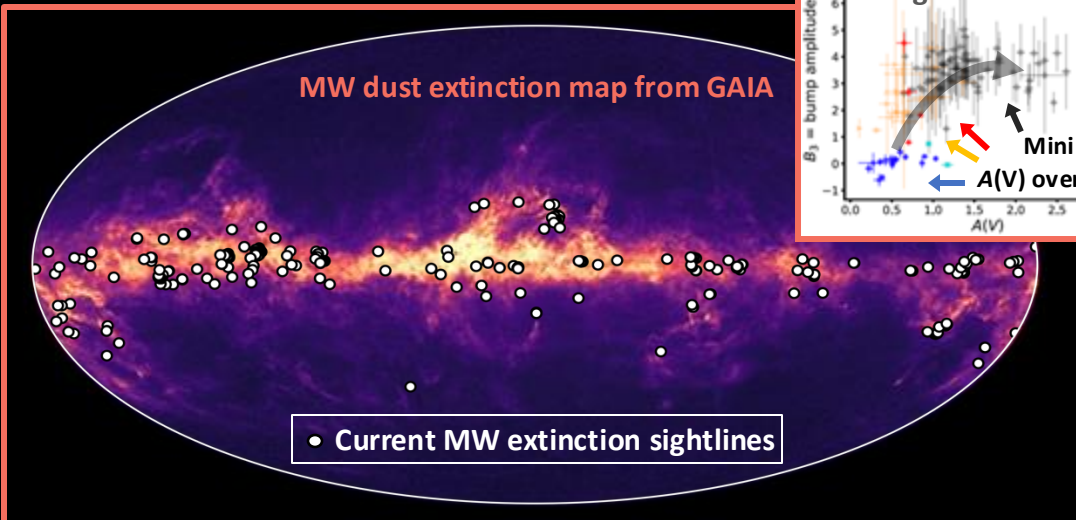
Ultraviolet Extinction Sky Survey (UVESS): A mission concept to study dust extinction in the Milky Way

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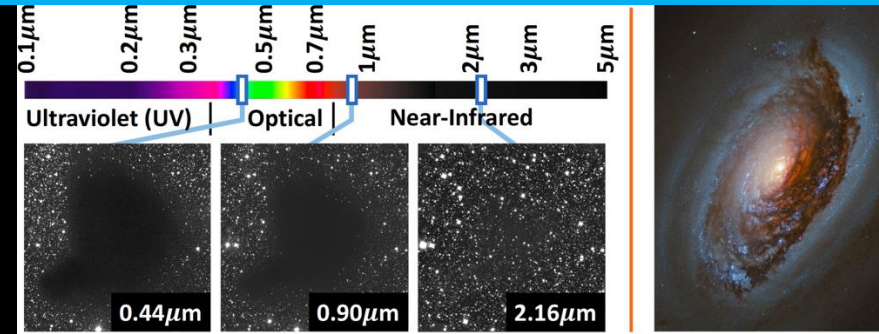
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Motivation: Corrections for dust extinction are one of the largest sources of uncertainty for deriving properties of stars and galaxies, particularly when relying on UV wavelengths (see right). UVESS would map the variability in dust extinction curves and the 2175Å absorption feature for ~3000 MW sightlines. These will offer valuable insights into the composition, size distribution, and processing of interstellar dust.

Current Limitations: ~400 MW sightlines to date from past/current UV spectroscopic facilities [1,2], which probe moderate extinction due to OB stars residing primarily in the MW disk (see below).



Left: dust extinction for a nearby molecular cloud (Barnard 68). Bluer light has more extinction than redder light. Right: Galaxies contain numerous dusty regions that affect their observed UV-NIR emission.



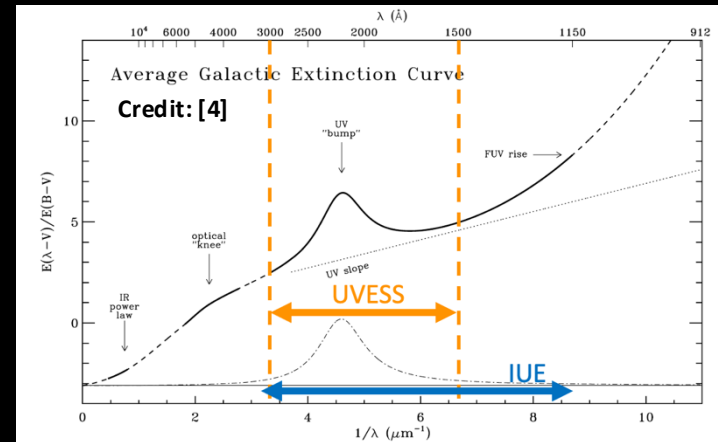
UVESS Overview

- Spectral Coverage: 150-300nm
- Spectral resolution: $R \sim 140-270$
- Field of View: $\sim 1^\circ \times 1'$
- Effective Collecting Area: $\sim 100\text{cm}^2$
- Limiting depth: ~ 15 mag (AB)
- Payload: $\sim 200 \times 100 \times 100$ mm
- Target launch: 2028

UVESS would survey OBA-stars at all galactic latitudes, and probe MW sightlines with $A(V)$ comparable to LMC/SMC $\rightarrow$ test extinction curve parameter dependencies on ISM



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References:

[1] Fitzpatrick & Massa 2007 ApJ 663, 320

[2] Valencic et al. 2004 ApJ 616, 912

[3] Gordon et al. 2024 ApJ 970, 51

[4] Fitzpatrick 2004 ASPC 309, 33