Update on optical measurements

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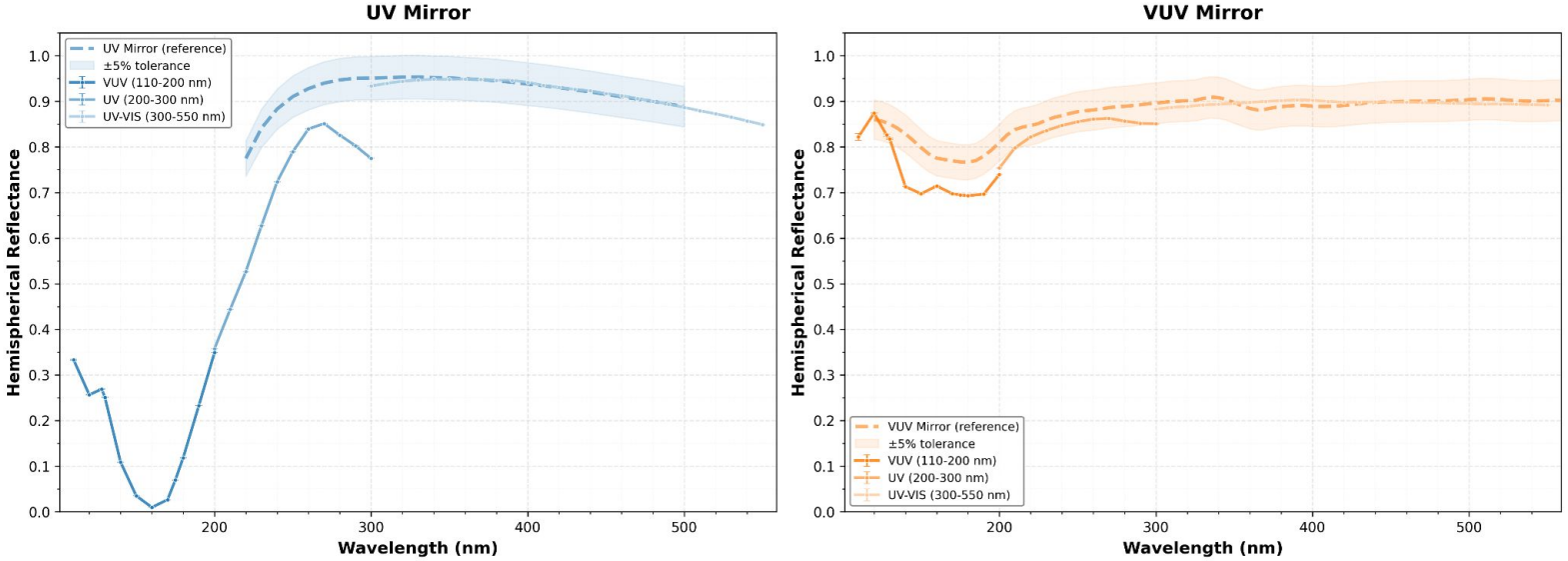
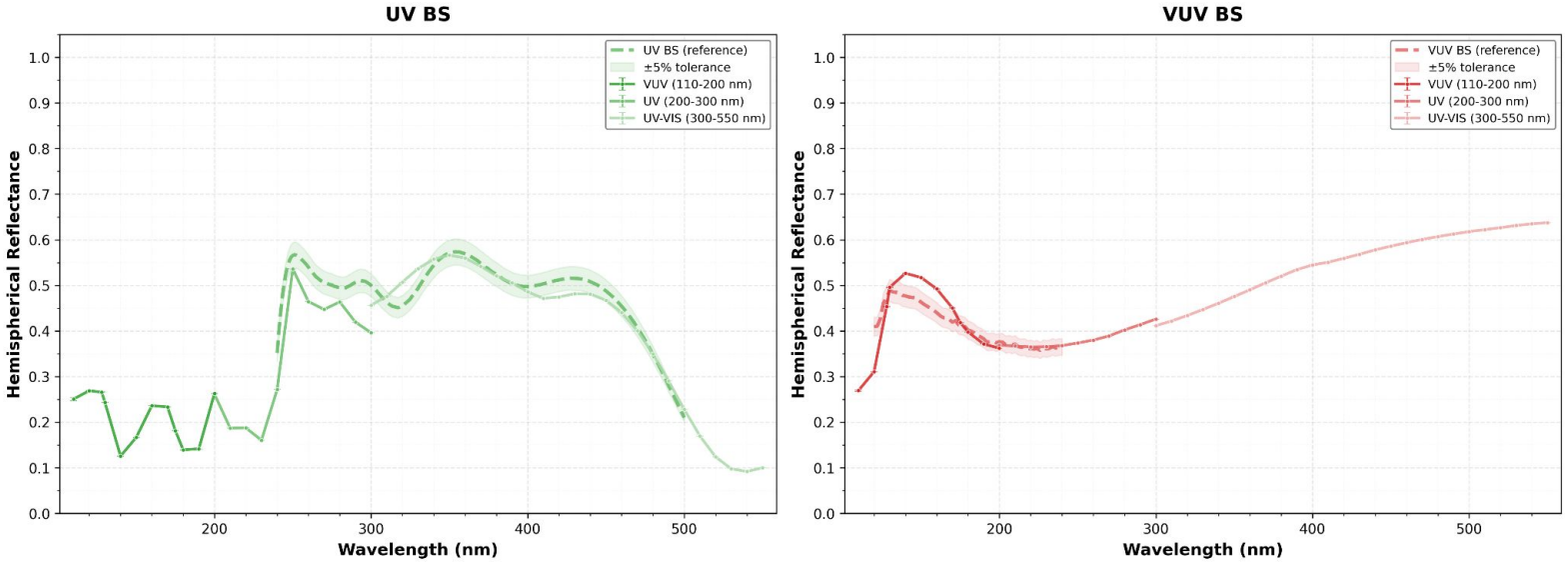
DUNE-IFIC Group Meeting

November 05th 2025

CSIC Consejo Superior de Investigaciones Científicas
Universitat de València
IFIC Institut de Física Corpuscular
Excelencia Severo Ochoa

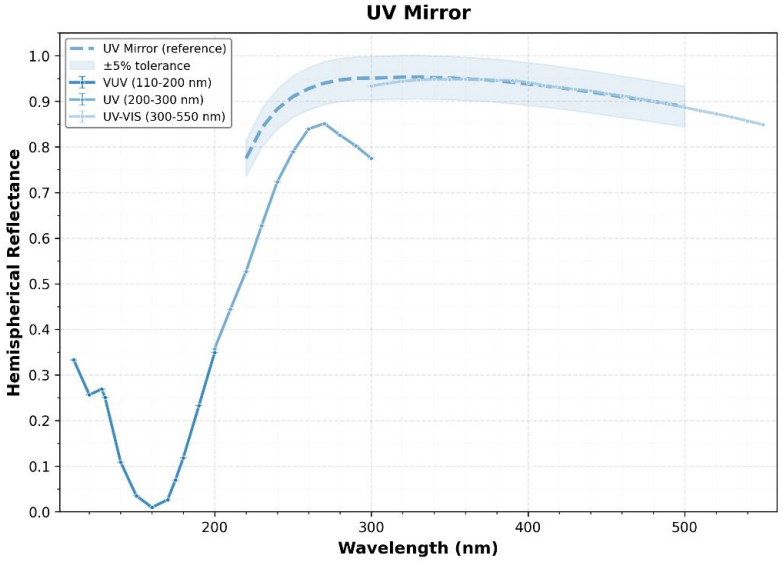
Specular reflectance measurements

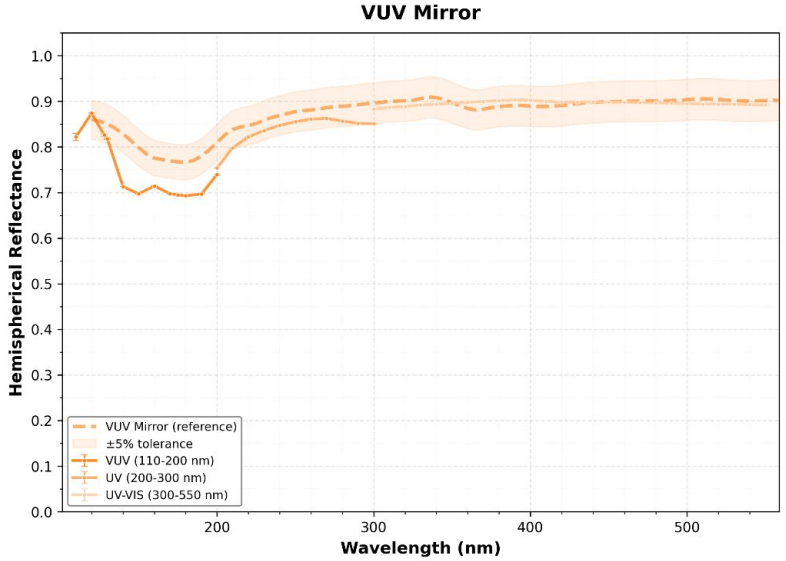


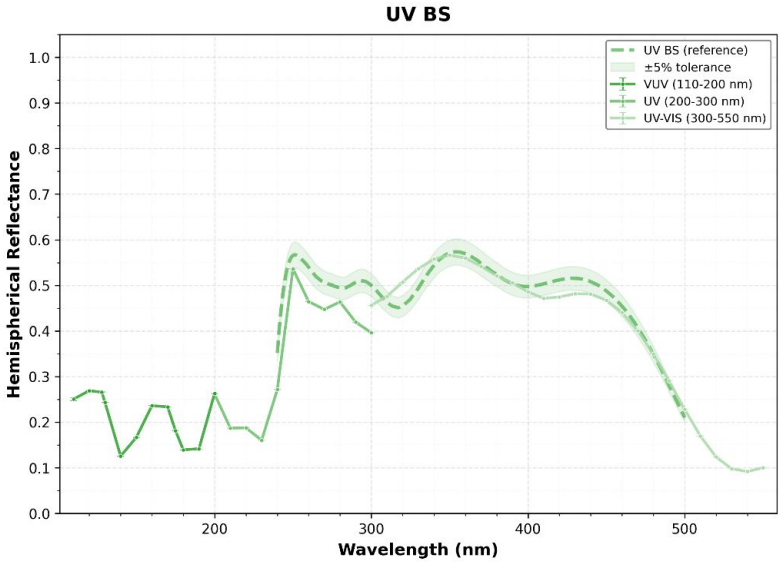


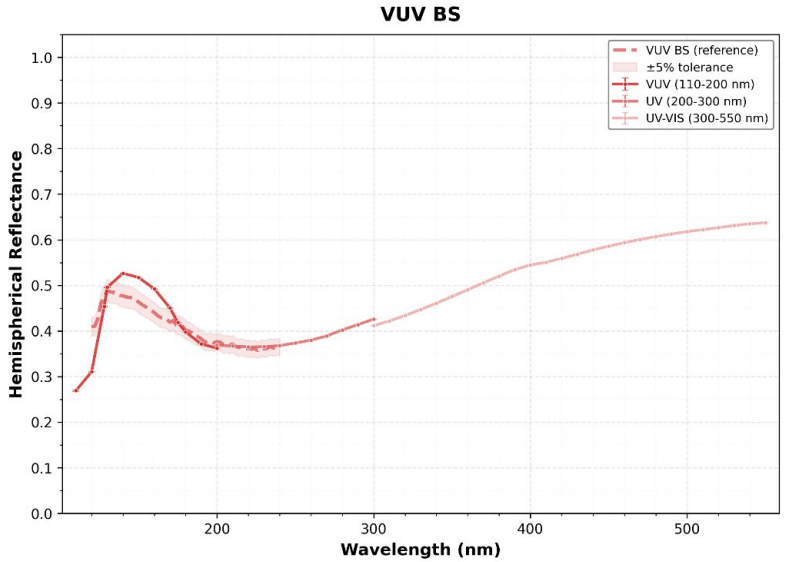
- **Three set of measurements** to cover the most of the light spectrum provided by the monochromator.
- Data were taken twice at:
  - **300 nm**:
    - 1st w/ Tg lamp in air.
    - 2nd w/ D_2 lamp in GAr.
  - **200 nm**: Both w/ D_2 lamp in GAr, yet different purity levels.

Specular reflectance measurements









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- Data were taken twice at:
  - **300 nm**:
    - 1st w/ Tg lamp in air.
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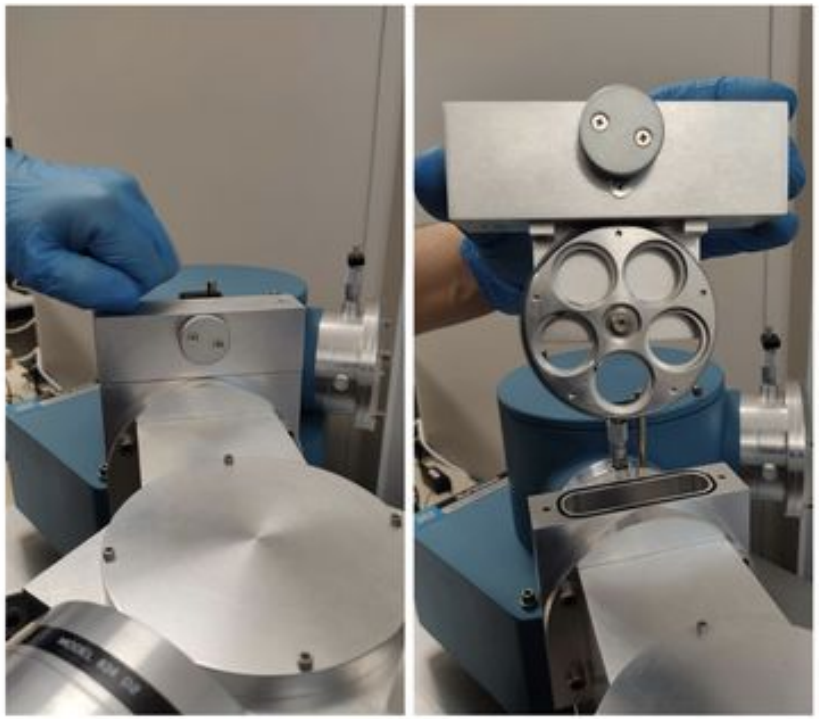
  - **200 nm**: Both w/ D_2 lamp in GAr, yet different purity levels.
- The reflectance variations at 200 nm seem to be compatible with light output fluctuations (≤ 1% in intensity).
- What happens at 300 nm in GAr? 🤔

Second order diffraction

Back to early 2022



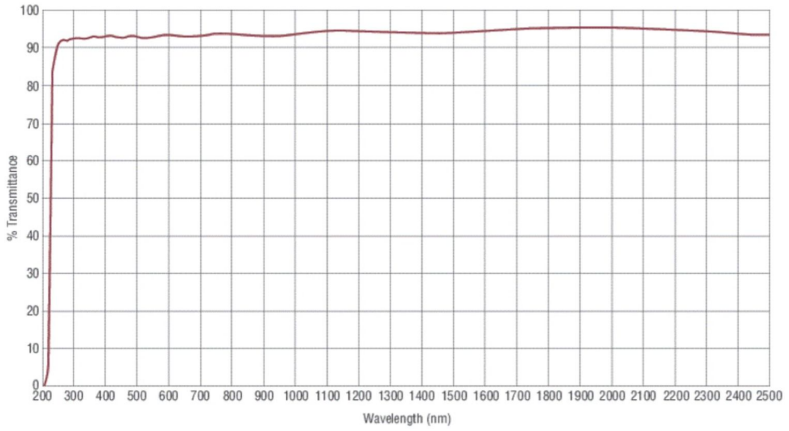
Two Long pass filters

Used to suppress the second order component of the light at the selected wavelength lambda.

This is the component of half the wavelength value. Example: if 250 nm selected, the second component is of 125 nm.

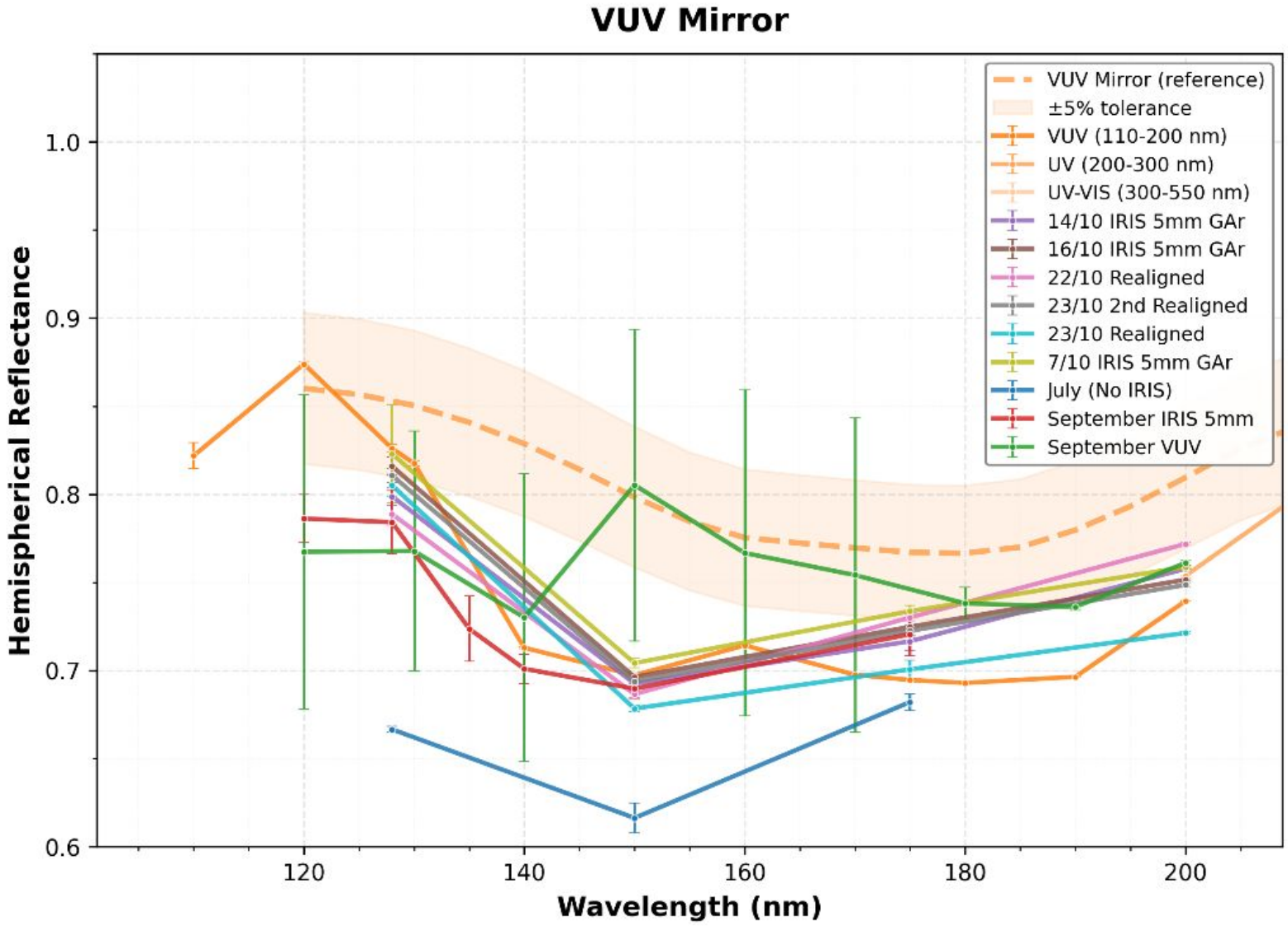
400 nm Long pass filter position: 3

225 nm long pass filter position: 4

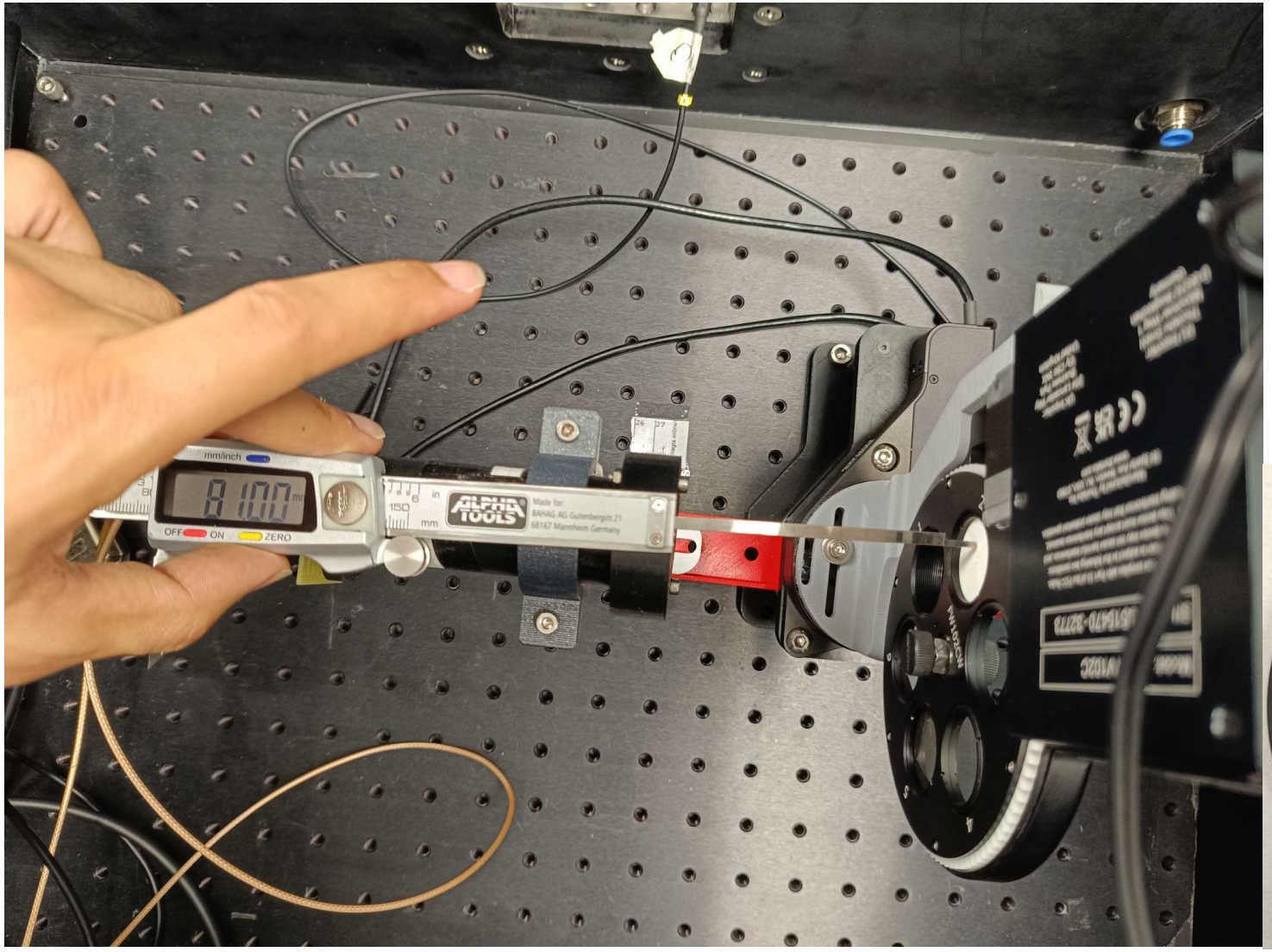


- What happens at 300 nm in GAr? 🤔
  - **150 nm second order diffraction** light from the VUV is also detected @ 300 nm in GAr.
  - A long pass filter is indispensable to suppress the 2nd VUV components beyond 225 nm.
  - An estimate of the 150 nm 2nd diffraction order fraction @ 300 nm is derived from intensities @ 150 nm in GAr & @ 300 nm in air from each specular sample:
    - **14 - 21% ~ 2nd diffraction order @ 300 nm in GAr**.

Specular reflectance measurements: mask effects



Alignment effects

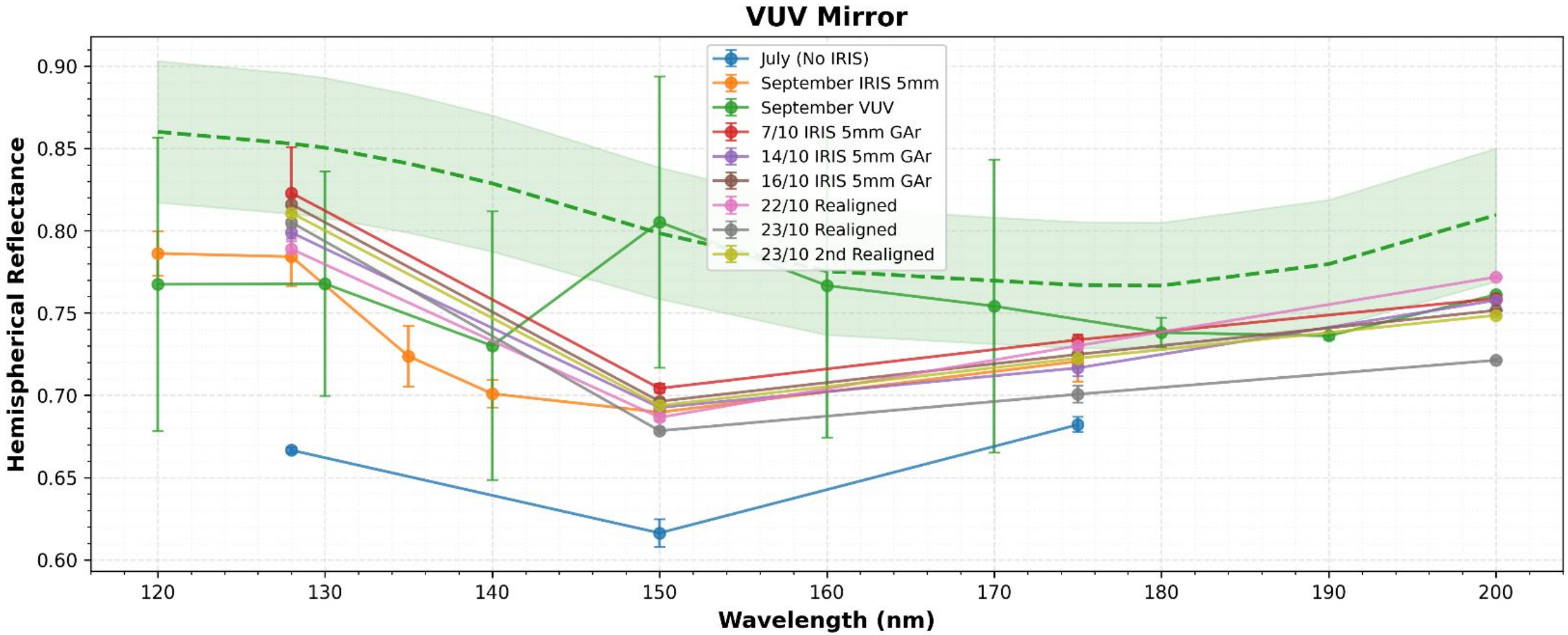


- **Three set of reflectance measurements** while ensuring the same alignment:
  - Same distance PMT-sample: 81 mm.
  - Offset position via VUV mirror @ 500 nm.

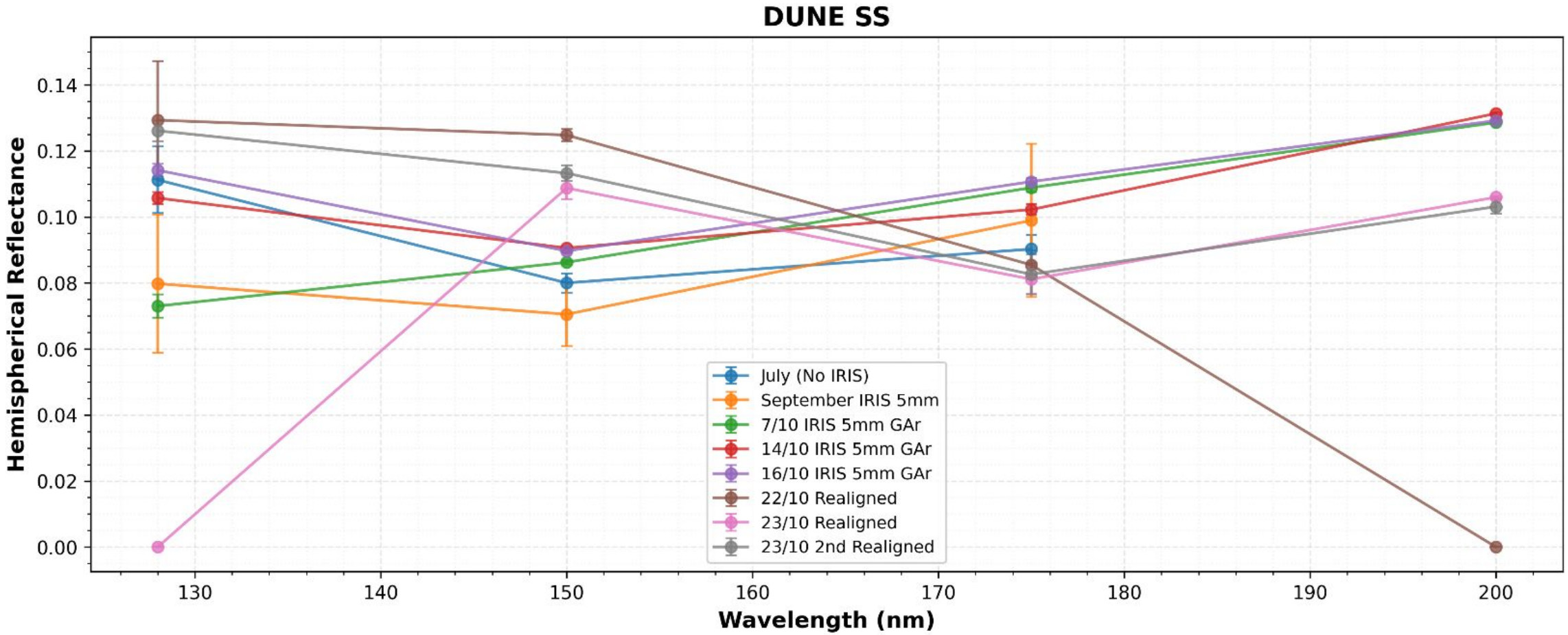
- **What is the impact on the computed reflectance?**

Alignment effects: VUV Mirror

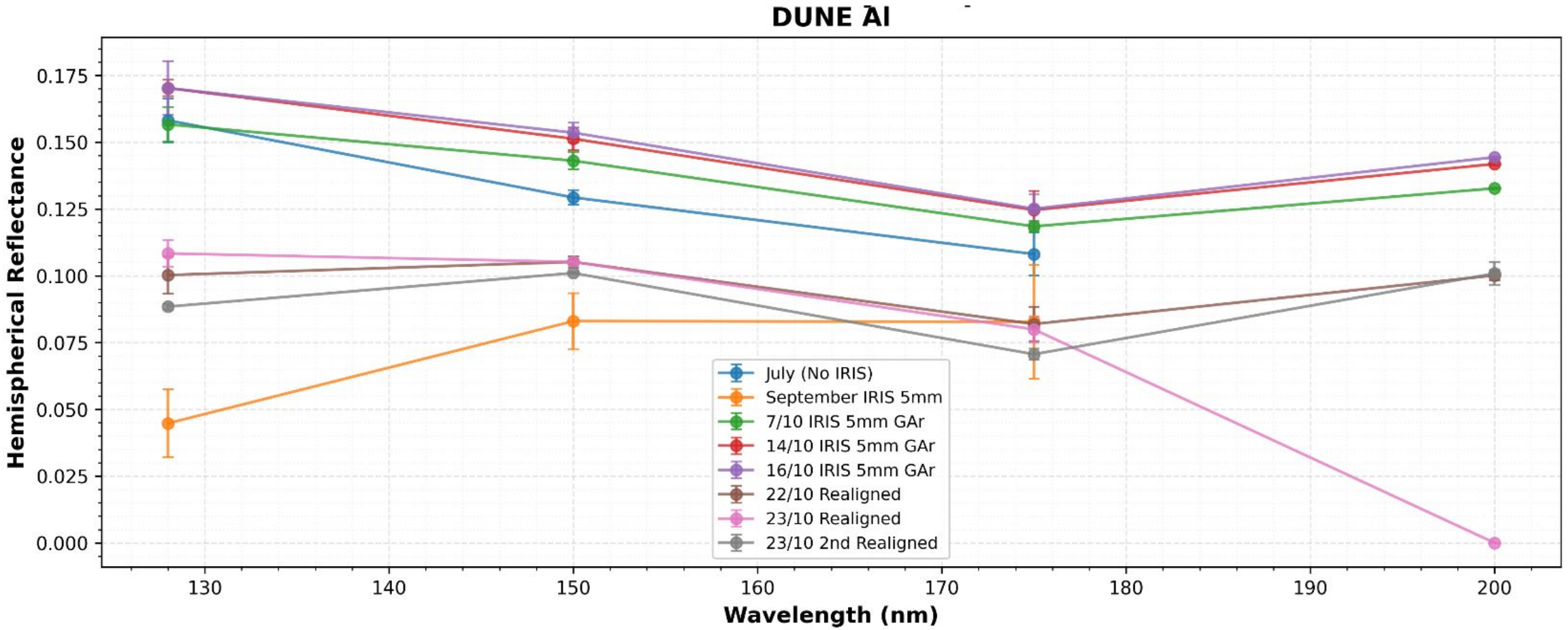
No ring model is employed for specular samples



Alignment effects: DUNE Stainless Steel



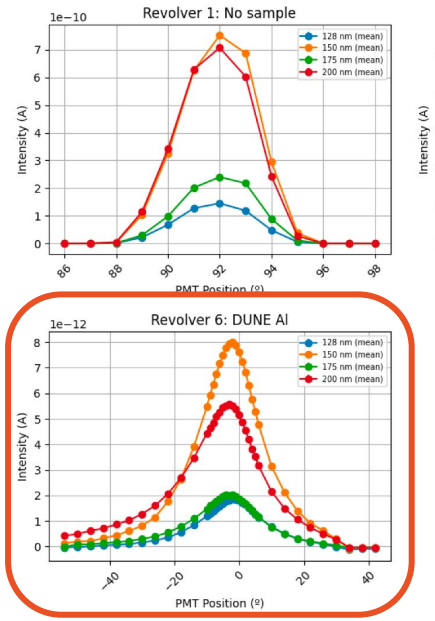
Alignment effects: DUNE Aluminum

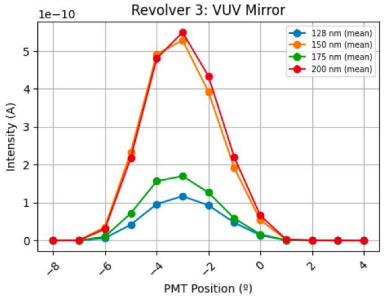


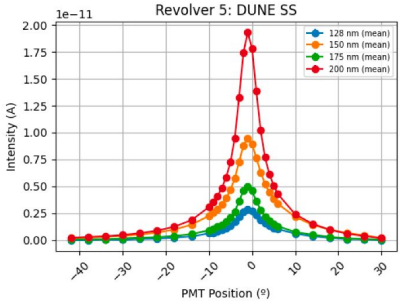
Alignment effects: DUNE Aluminum

Samples were removed from the revolver between measurements

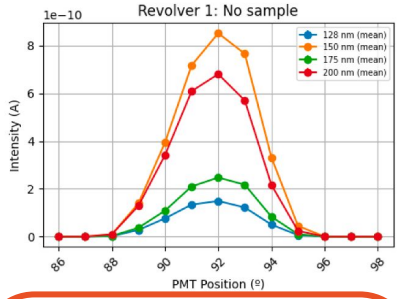
Averaged Intensity per Revolver (16/10)

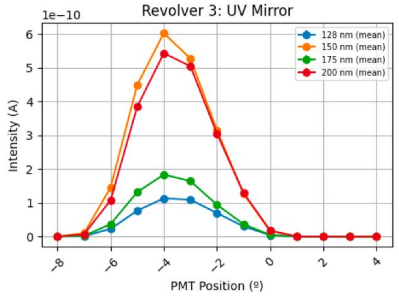


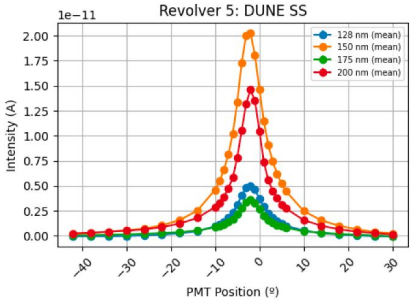




Averaged Intensity per Revolver (22/10)







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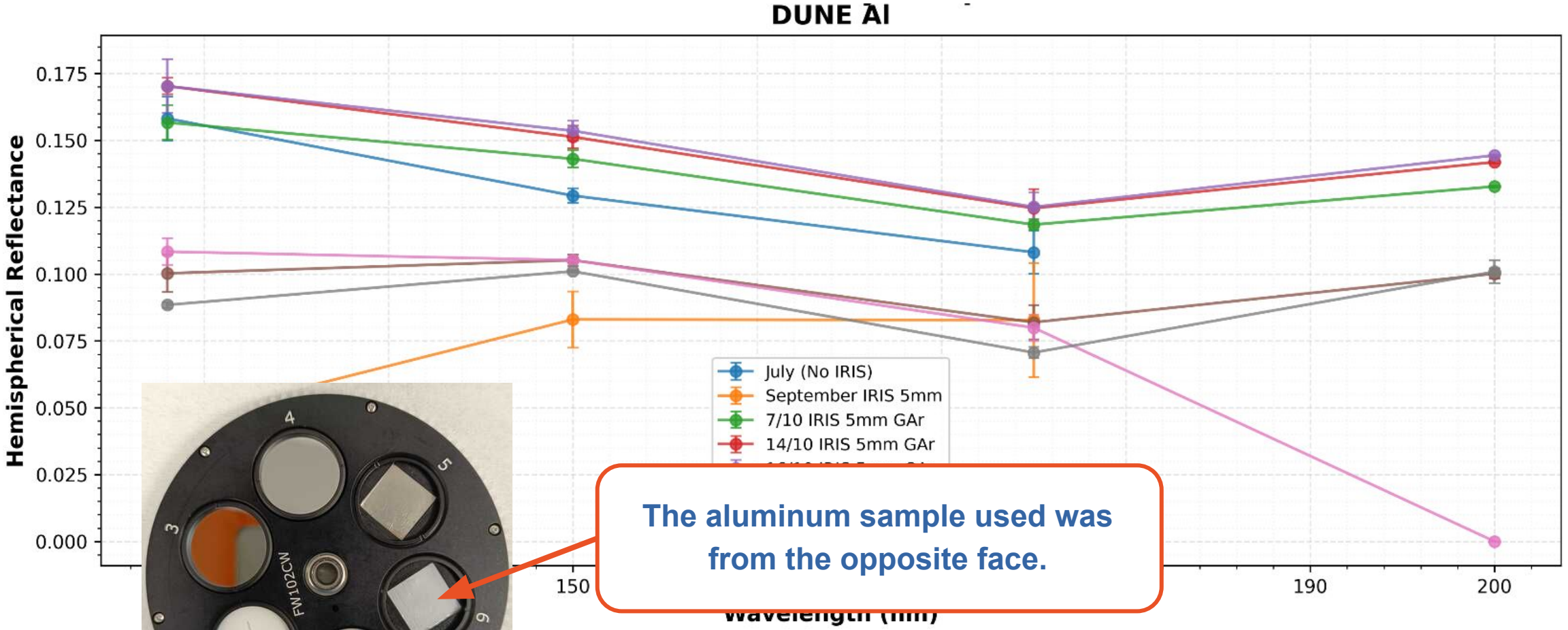
Alignment effects: DUNE Aluminum



The aluminum sample used was from the opposite face.