



Mirror Reflectivity



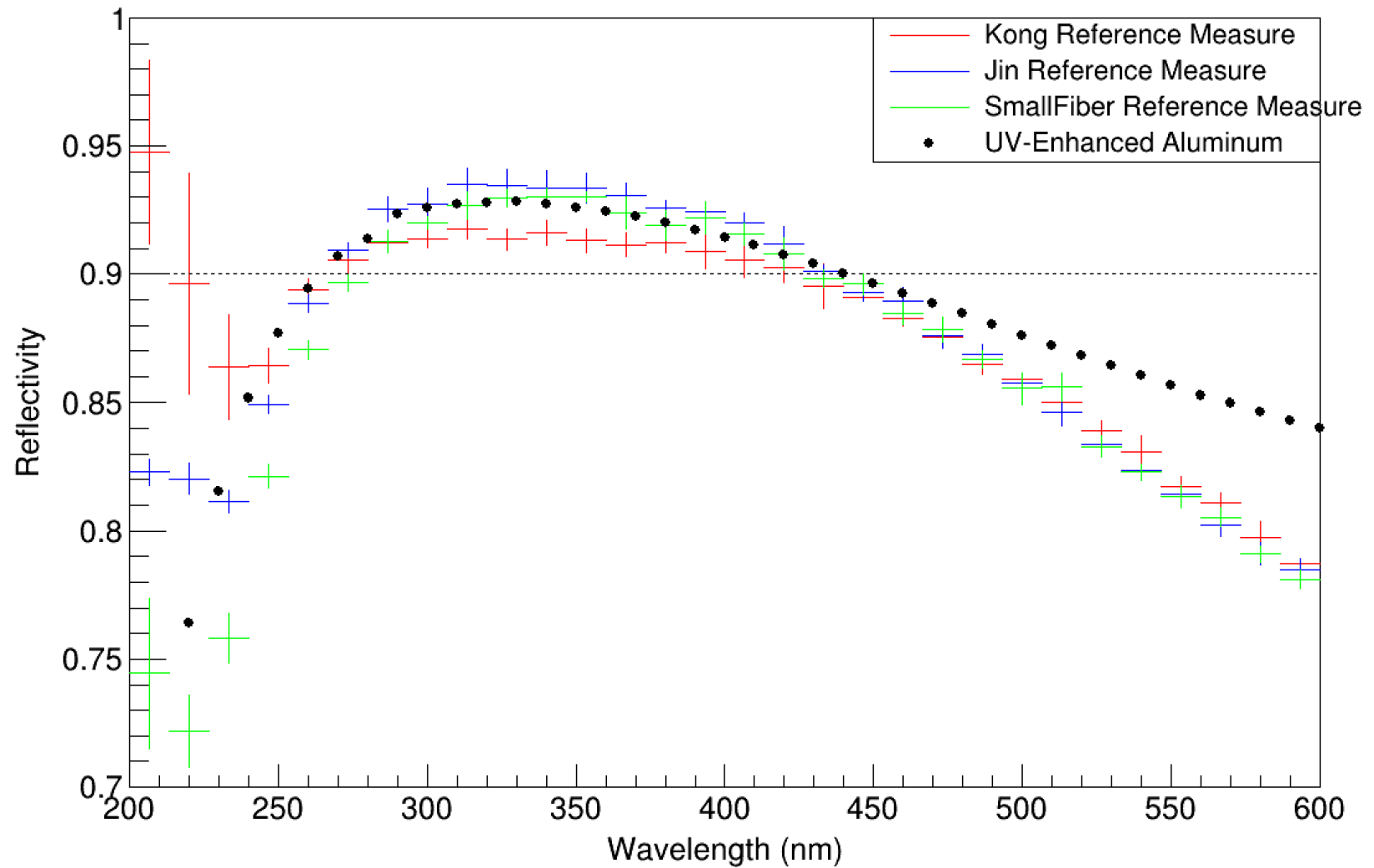
Brookhaven
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Created by **Jin Feng Zhuang** under the guidance of Kong, Preet



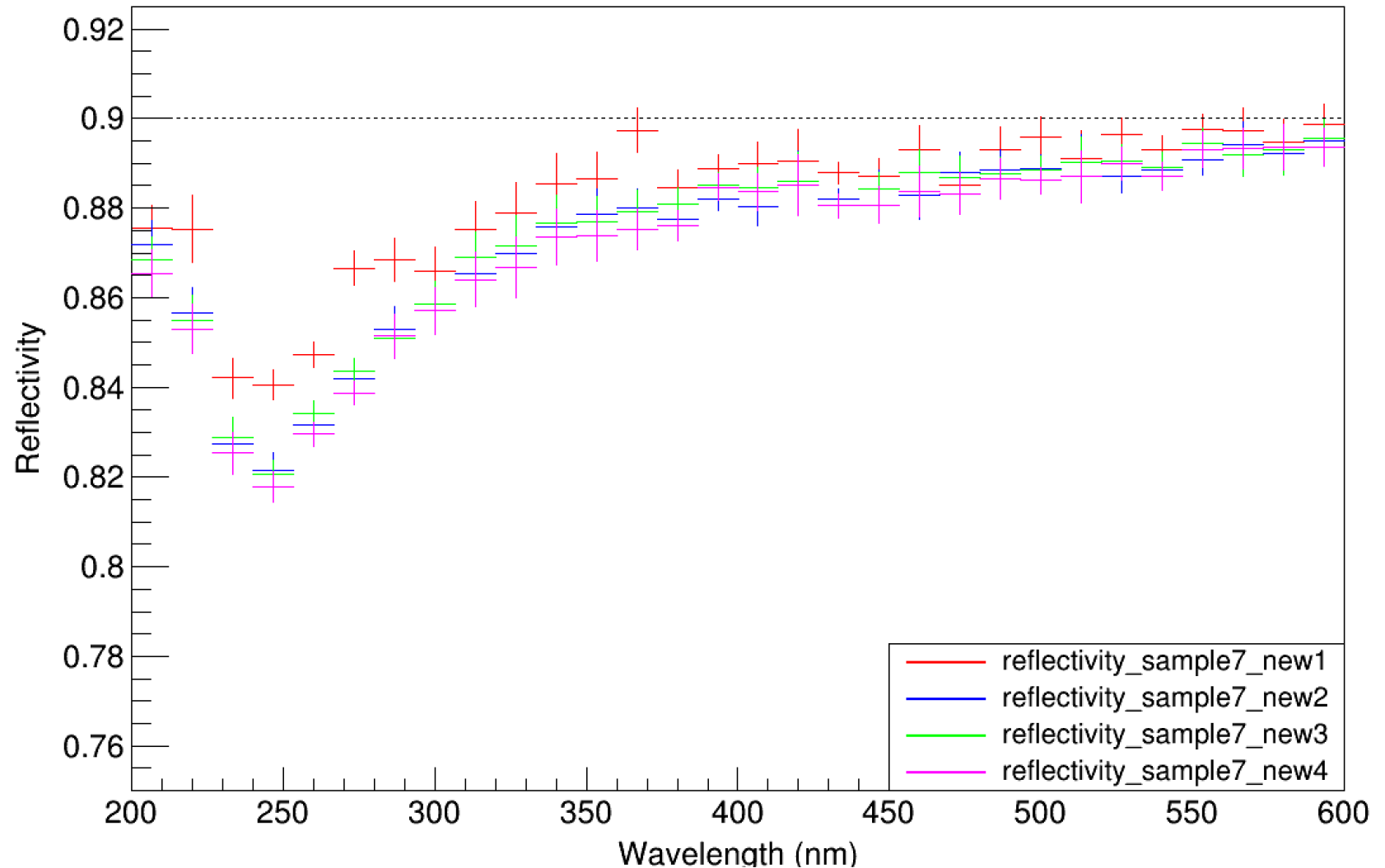
Reflection Comparison

- Reflectivity test on the reference mirror provided by Thor'sLab.
- My results is using a newer optic cable that can achieve a better reading.

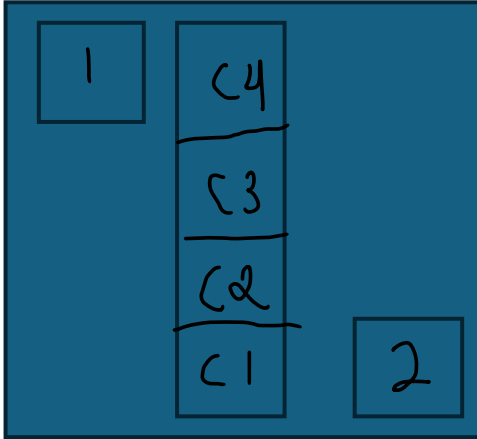


Sample 7

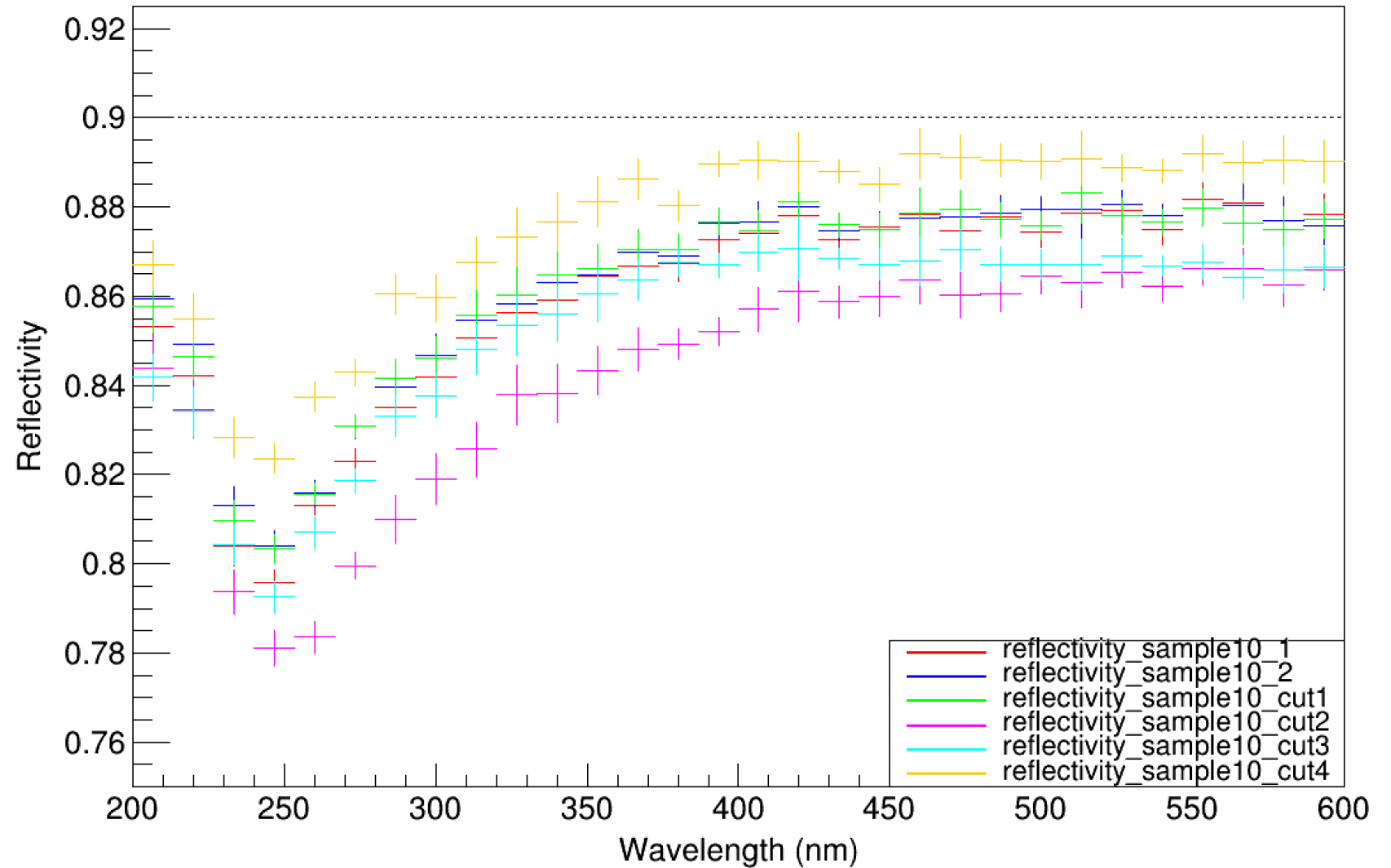
- **Our goal line is 0.9 from 300 to 600nm.**
- Sample 7 was based on a previous mirror coating that achieved a 0.9 reflection. However, we have been **unable to reproduce this result.**
- Possible reasons for this discrepancy include our newer and more proper setup at BNL and the potential degradation of the mirrors over time due to oxidation.



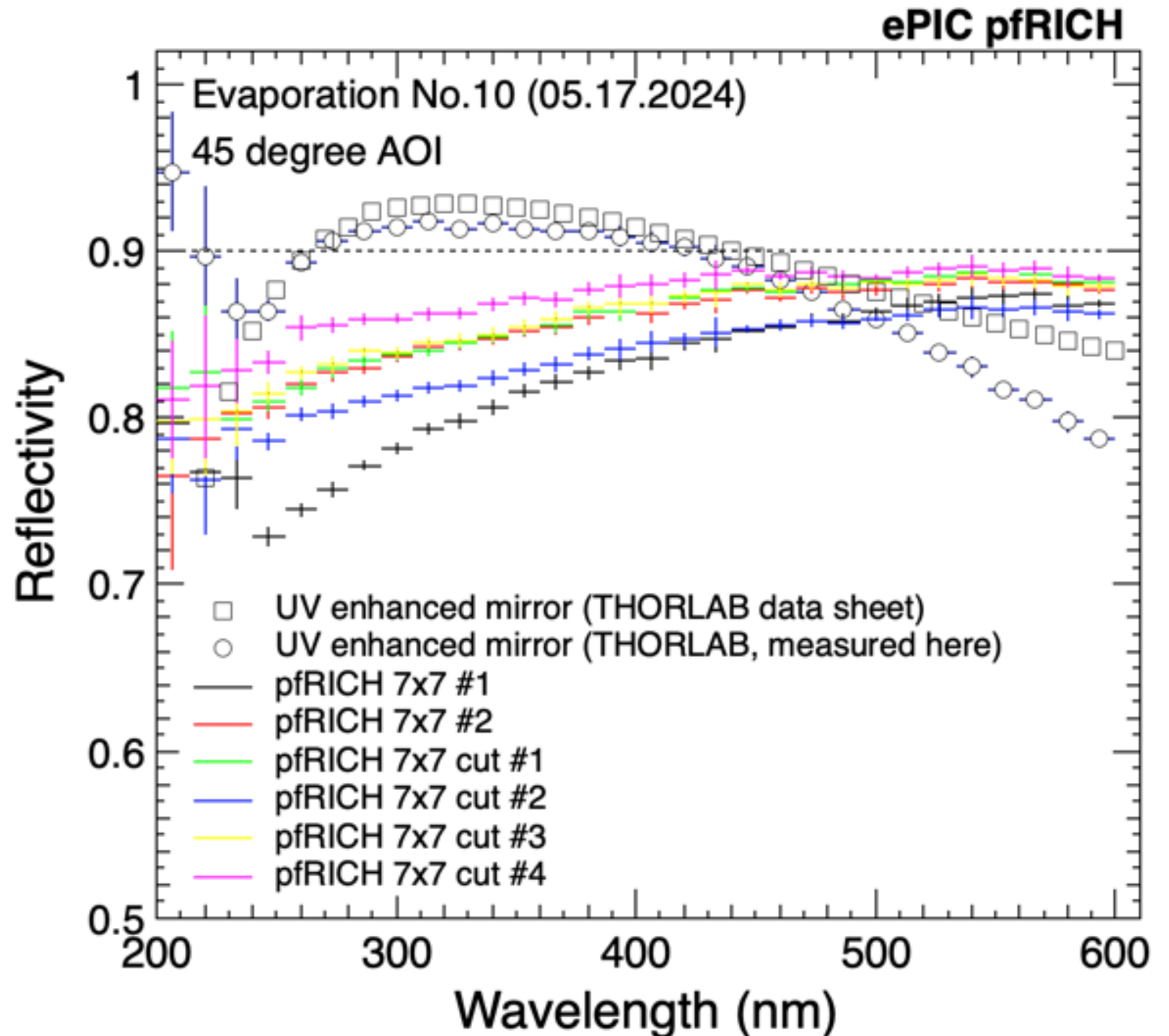
Sample 10 Reflection Comparison



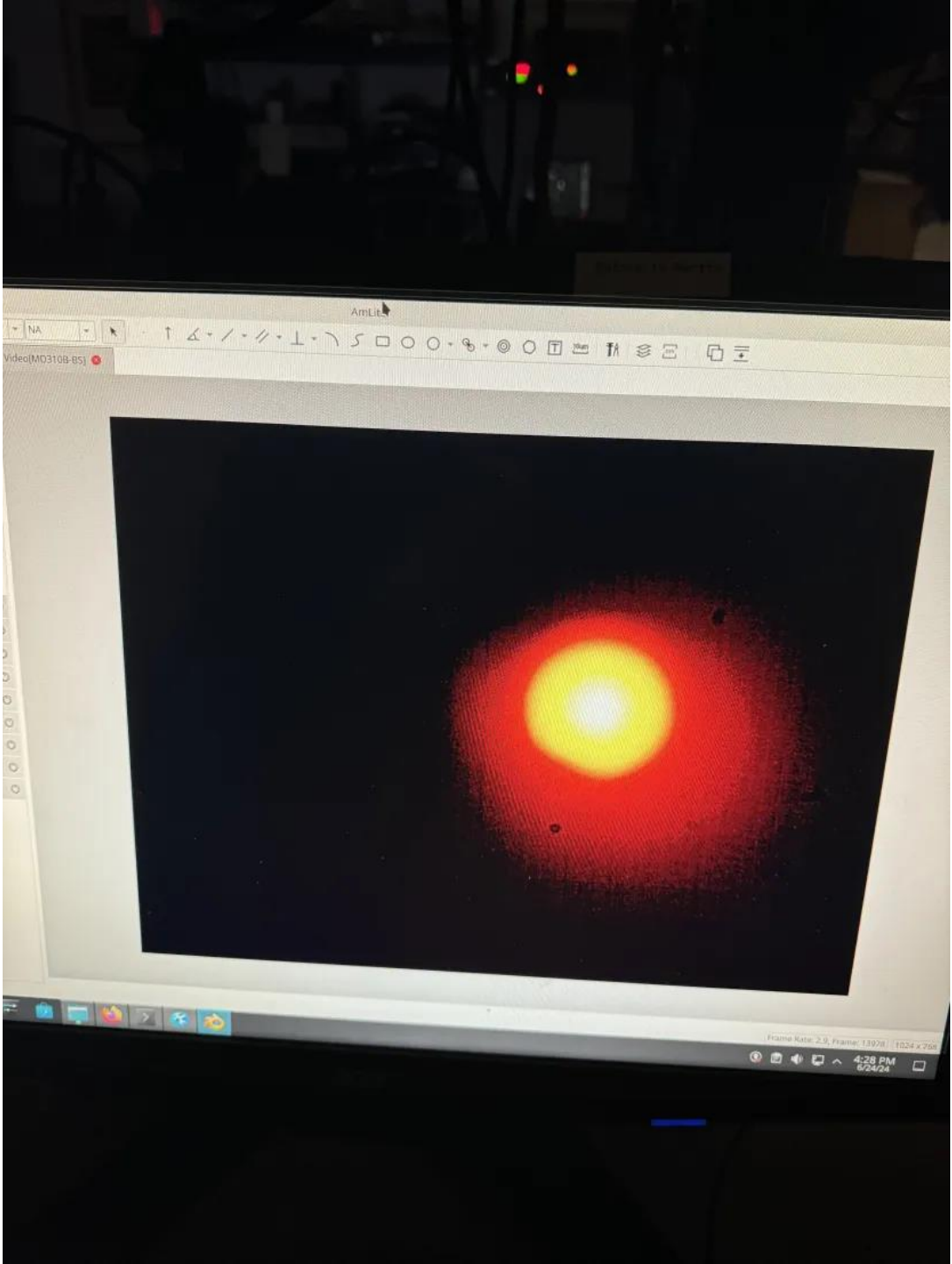
- Our results shows this for the order of reflectivity:
- $\text{Cut4} > 1 = 2 = \text{cut1} > \text{Cut3} > \text{Cut2}$



- This graph displays the measurements taken by my mentor, Kong, while using a smaller fiber optic cable.
- **Cut4 remains the best in both tests. While my results indicate Cut2 as the worst and this graph identifies Piece 1 as the worst.**
- This discrepancy could be due to the improved measuring conditions provided by the new cable and possibly poor storage of the intricate mirror.



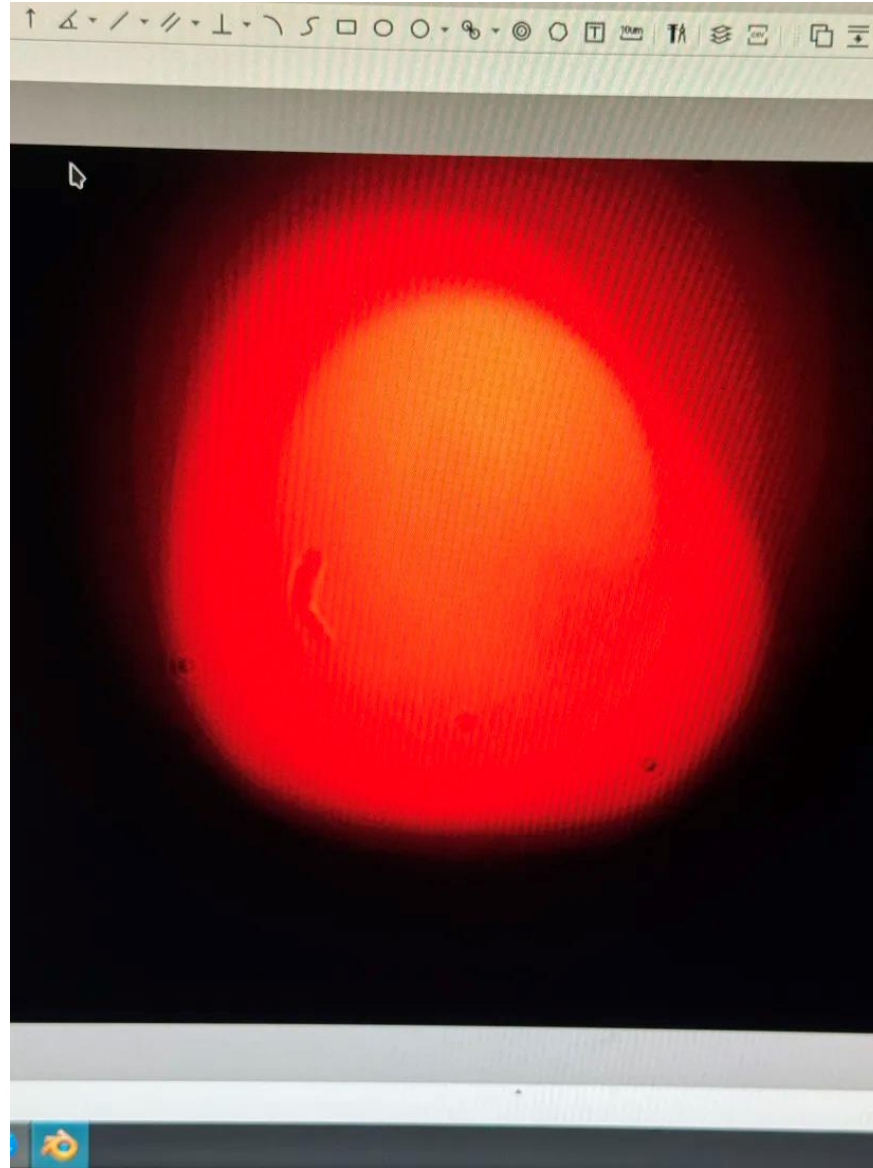
Small Optic Cable at
45 degree, 600nm



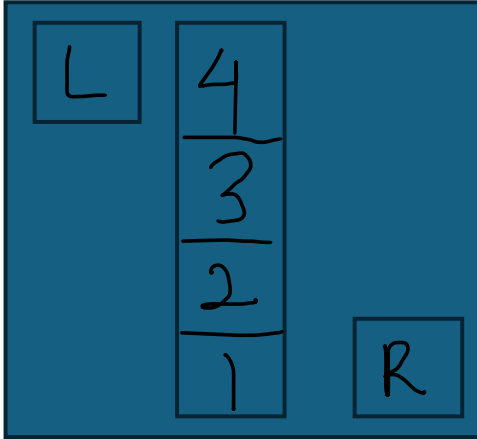
Sample 10 mirror
at 45 degree angle,
600nm



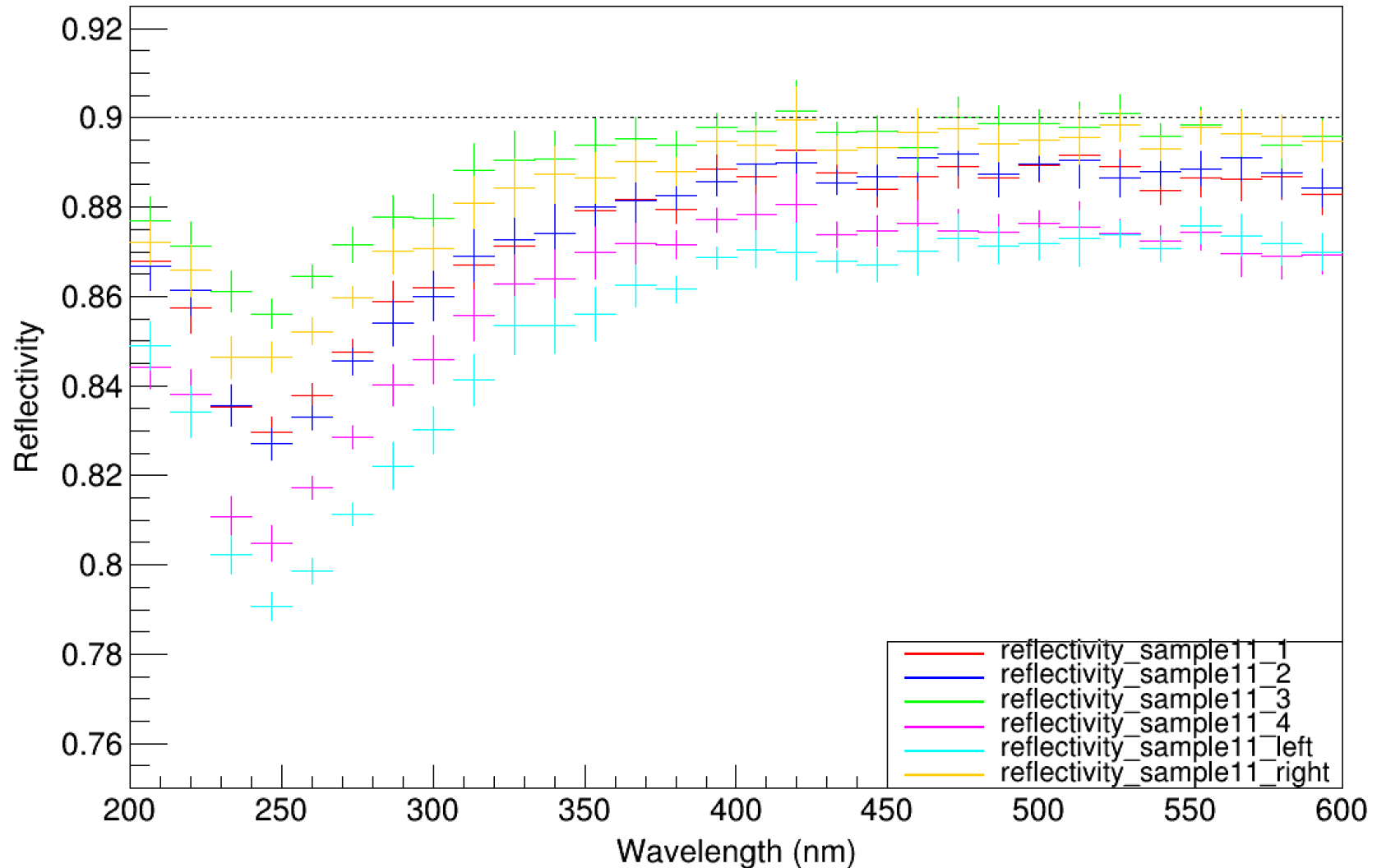
Sample 11 mirror
at 45 degree angle,
600nm



Sample 11 Reflection Comparison

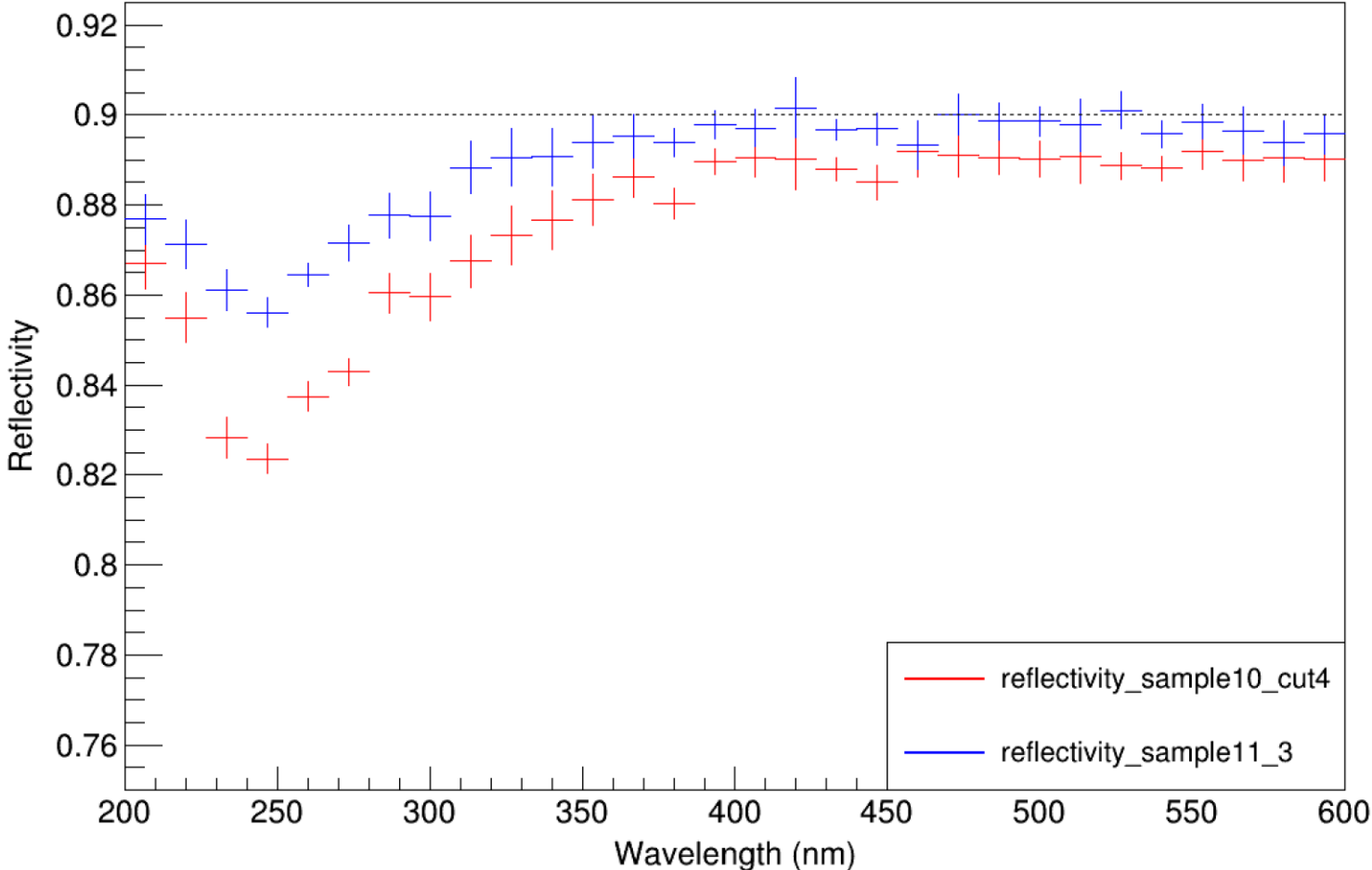


- Our results shows this for the order of reflectivity:
- $3 > \text{right} > 1 = 2 > 4 > L$
- In sample 10, the corners are the one with matching reflectivity. Not the case here



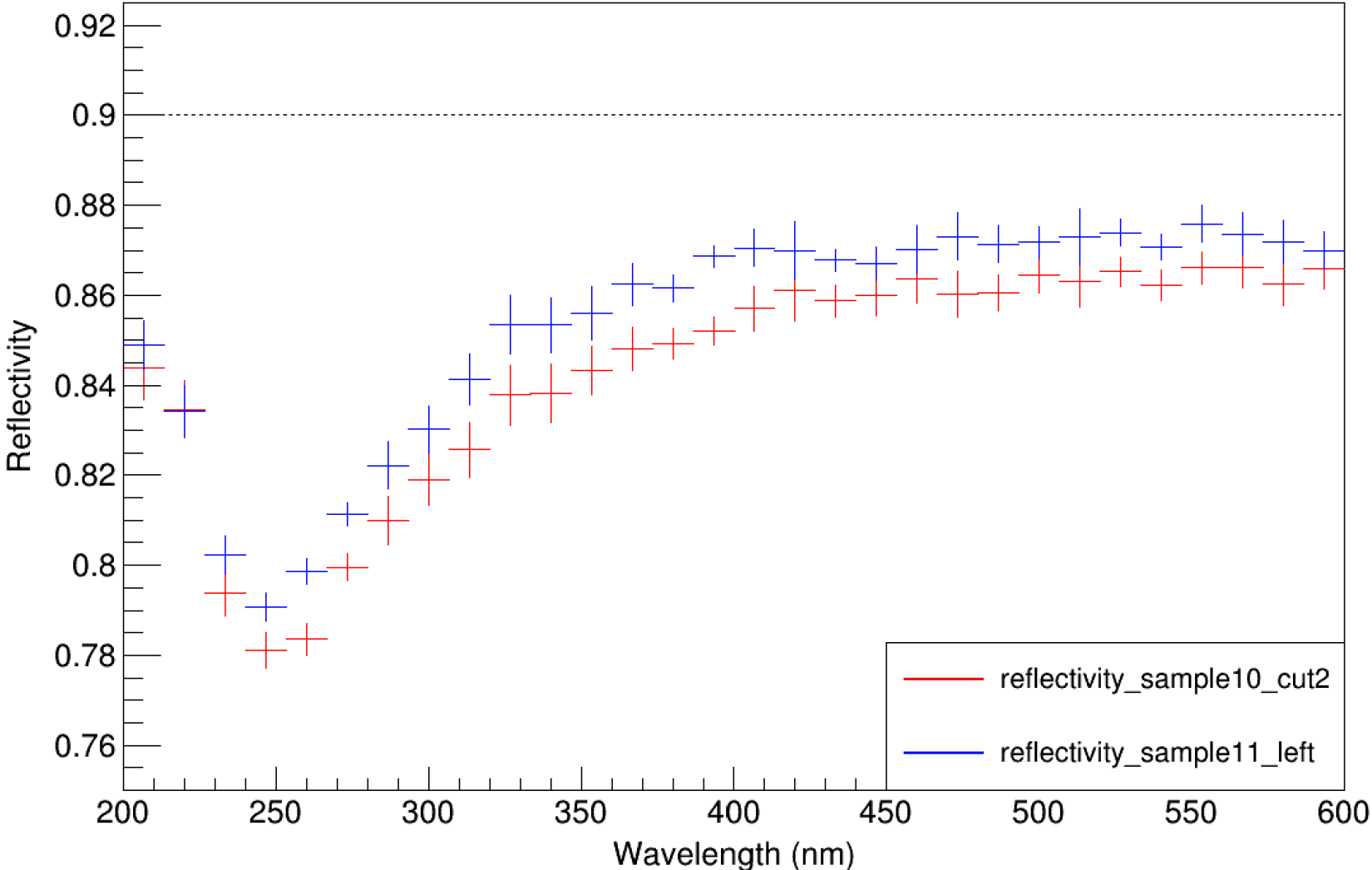
Sample 10 v Sample 11

- **Best case** scenario from both sample plotted against each other.



Sample10 V Sample 11

- **Worst case** scenario plotted against each other from both sample.
- Sample 11 still outperforms Sample 10 in all wavelength.



Summary

- Our goal is to achieve 0.9 reflectivity
- Sample 11 achieved better result than Sample 10.
- Our next objective is to determine how the placement position affects the final results. As observed in samples 10 and 11, the outcomes at the corners can either be relatively consistent or entirely different. Investigate the difference between the mirrors from the same patch.
- We also plan to eliminate the wave-like distortion observed in sample 11 to assess its impact on the final result.

