

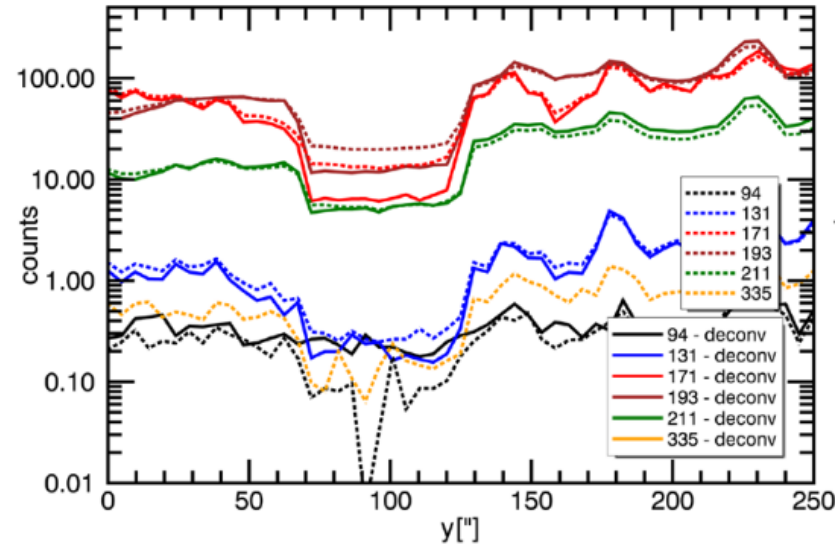
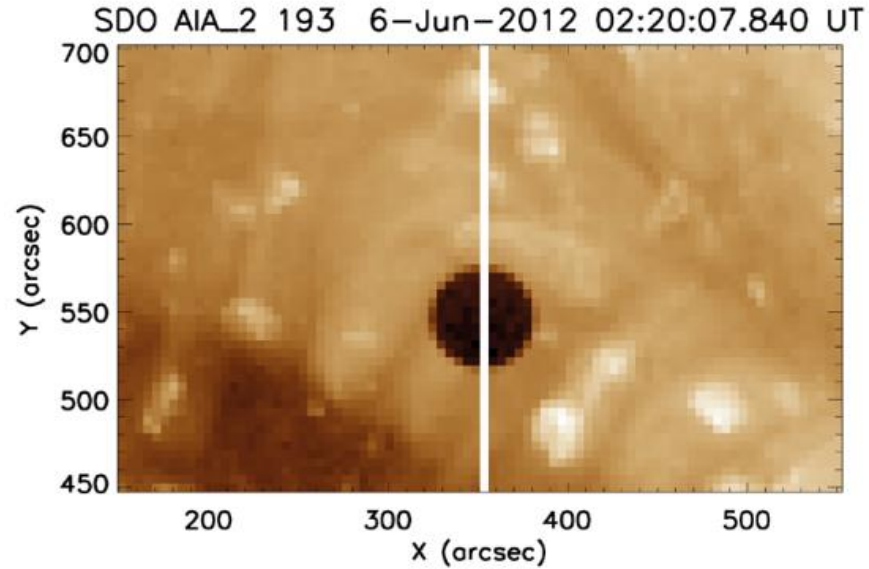


# Revised SDO/AIA Point Spread Functions to Correct for Long-Distance Scattered Light

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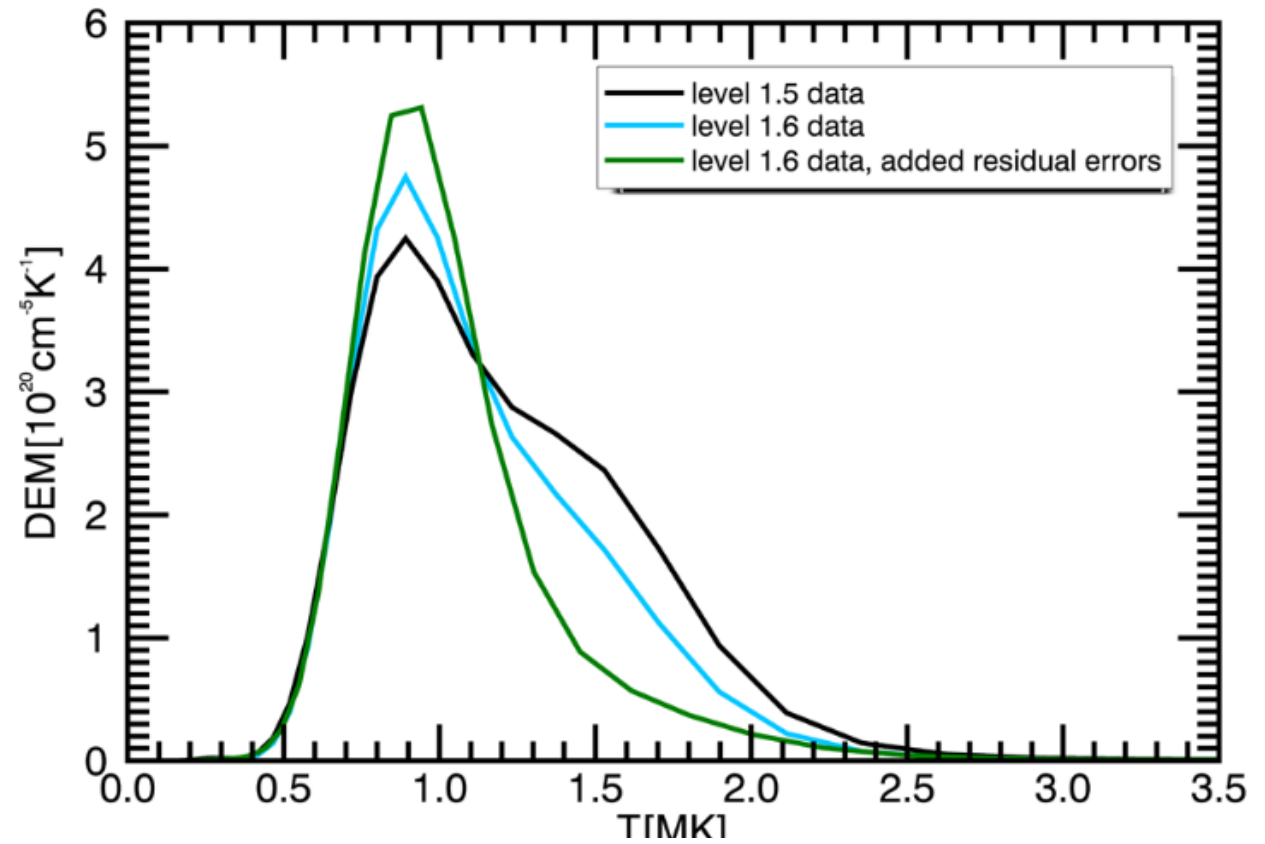
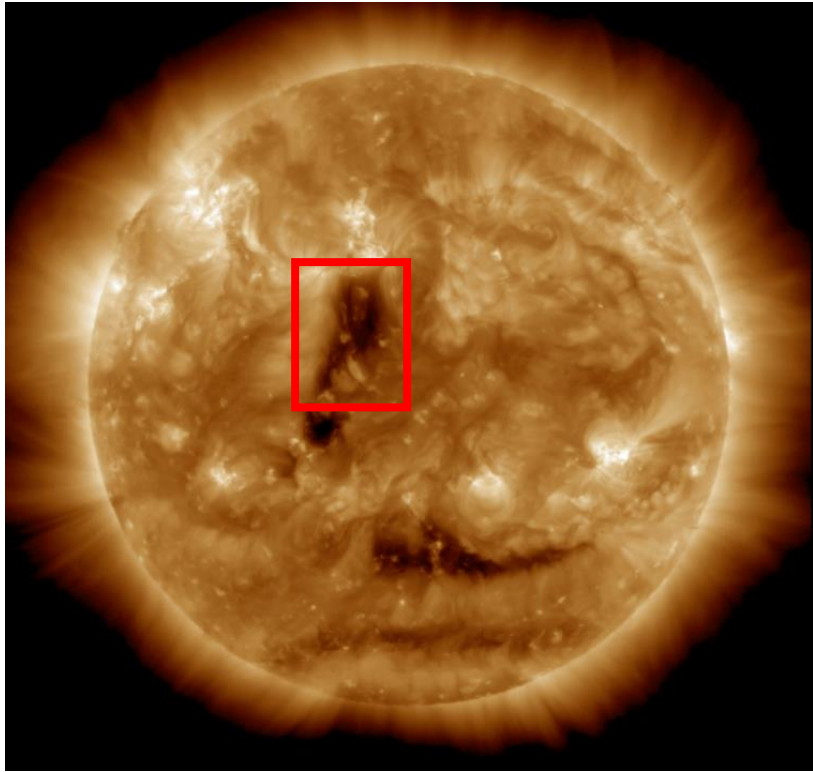
# Why do we need revised PSFs?



Channel	Venus	CH
94 Å	0.2	0.3
131 Å	0.2	1.2
171 Å	6.4	67.9

Channel	Venus	CH
193 Å	12.4	23.5
211 Å	5.3	6.2
335 Å	0.0	0.3

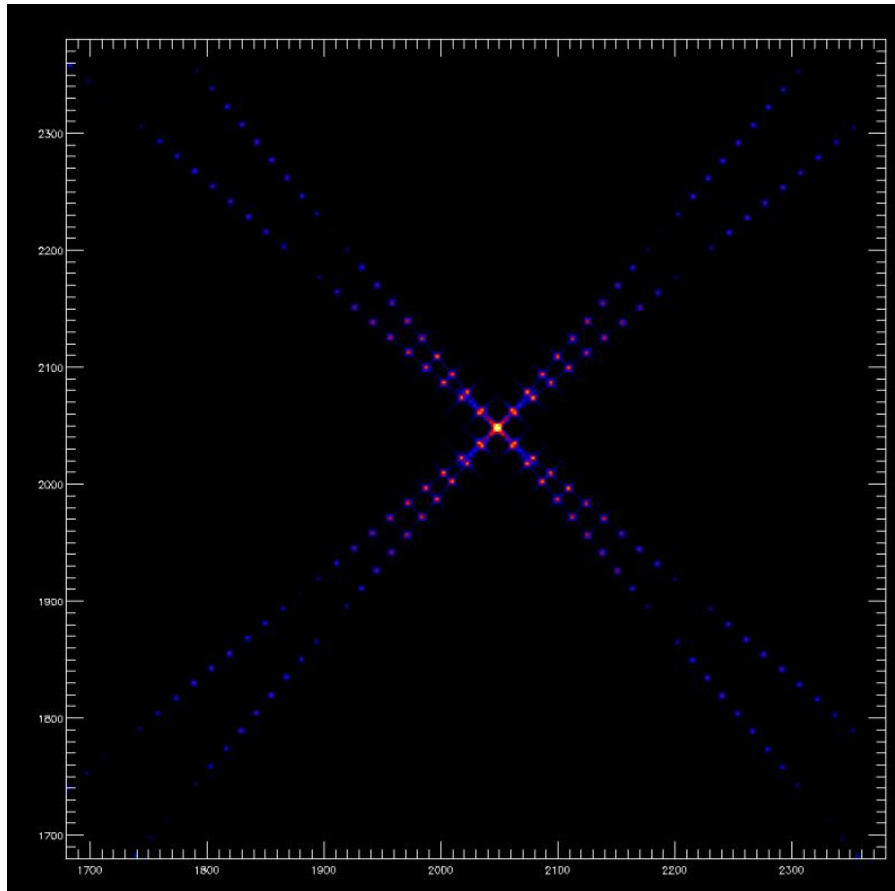
From Saqri et al. (2020)



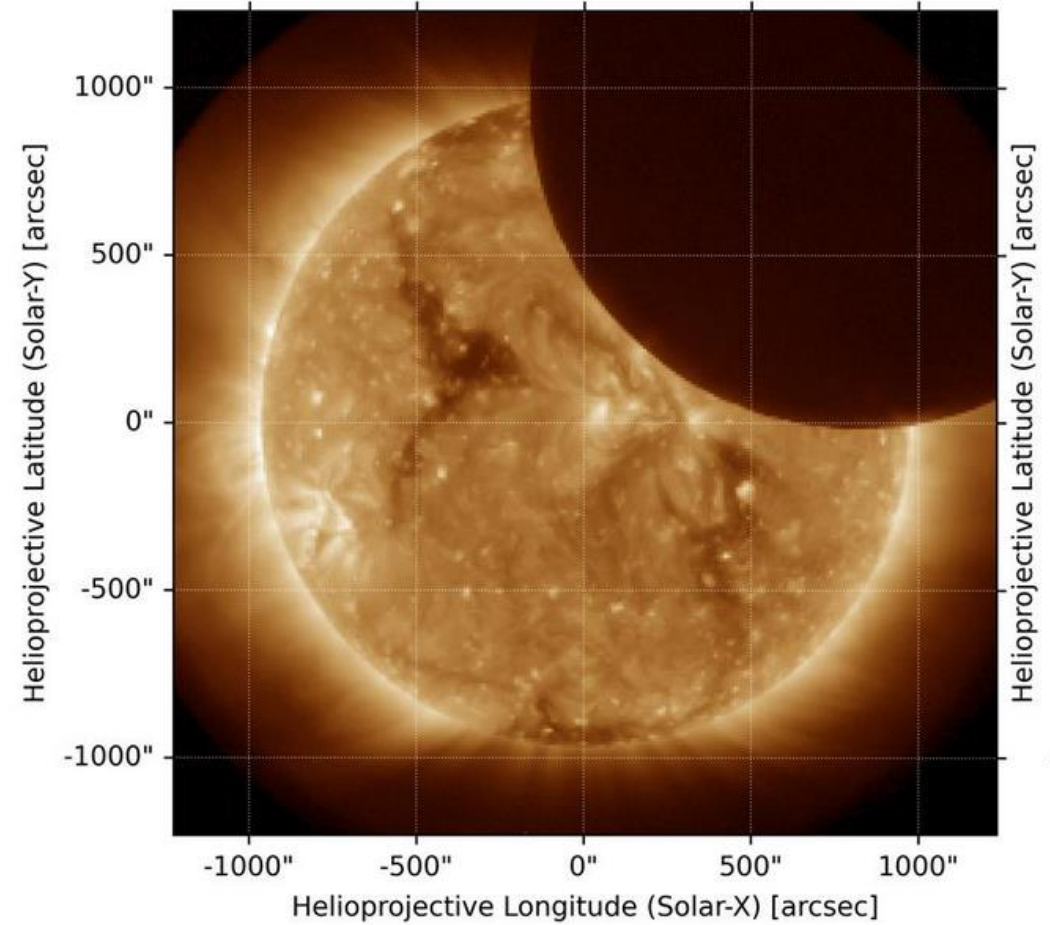
Channel	Venus	CH	Channel	Venus	CH
94 Å	0.2	0.3	193 Å	12.4	23.5
131 Å	0.2	1.2	211 Å	5.3	6.2
171 Å	6.4	67.9	335 Å	0.0	0.3

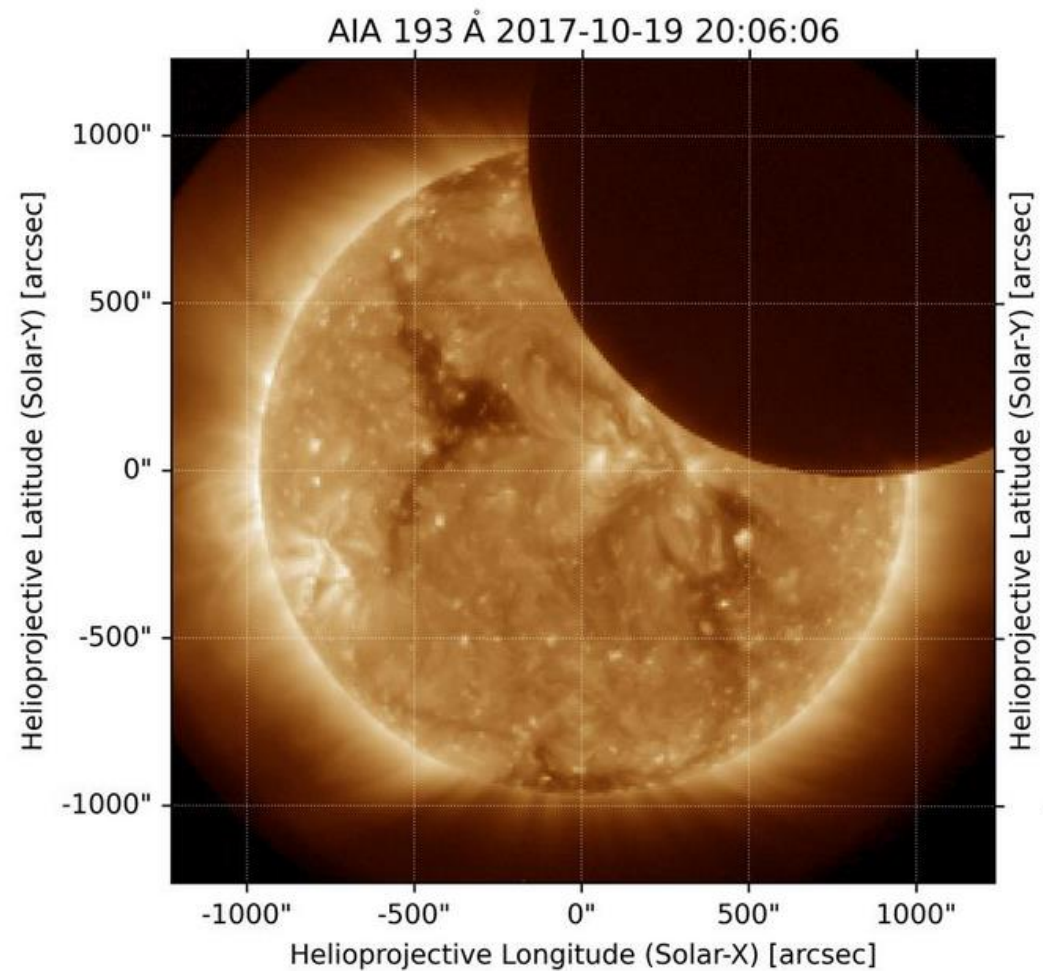
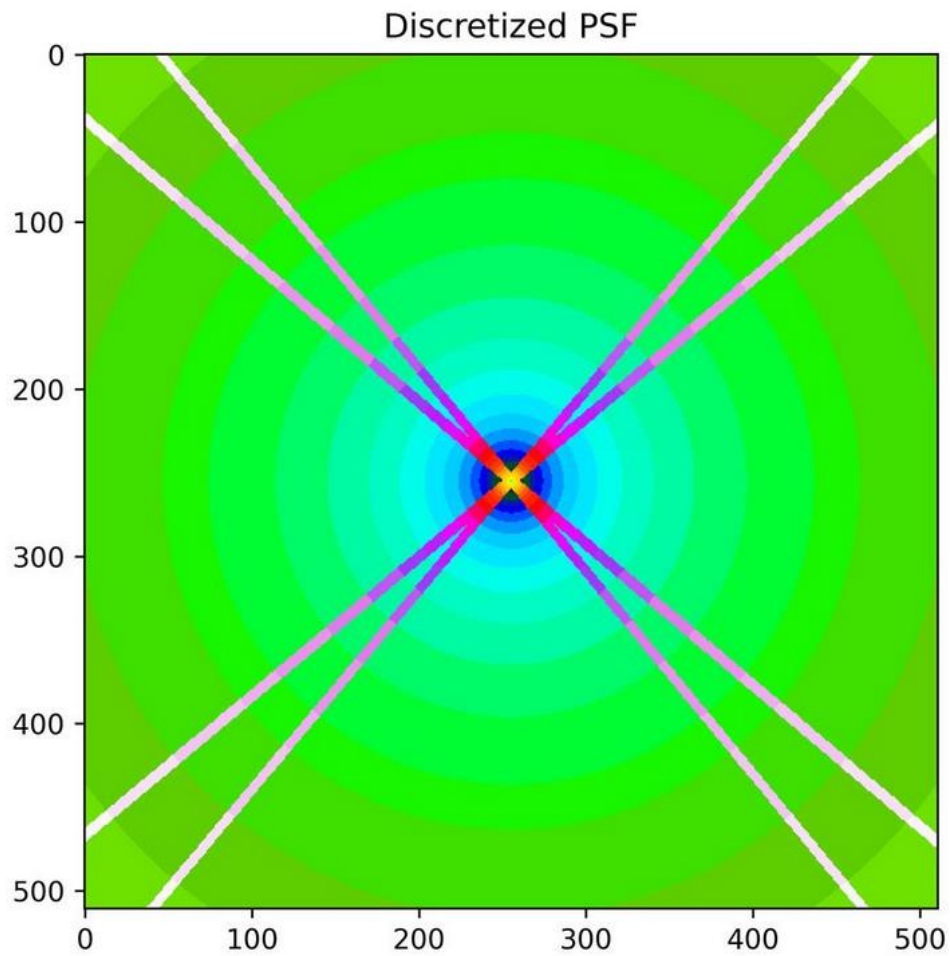
# How to derive/revise a PSF?

Original AIA 193 PSF



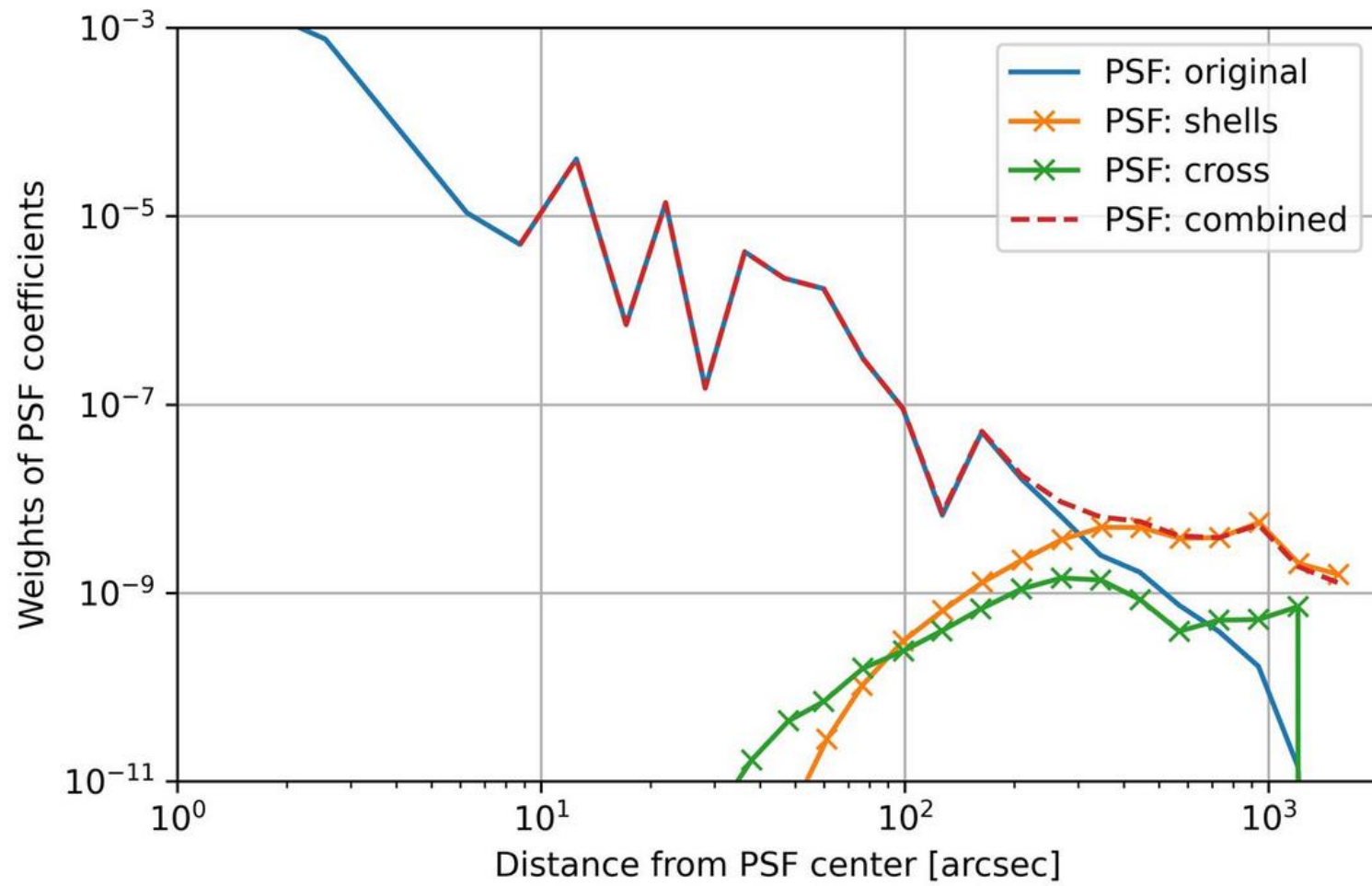
AIA 193 Å 2017-10-19 20:06:06



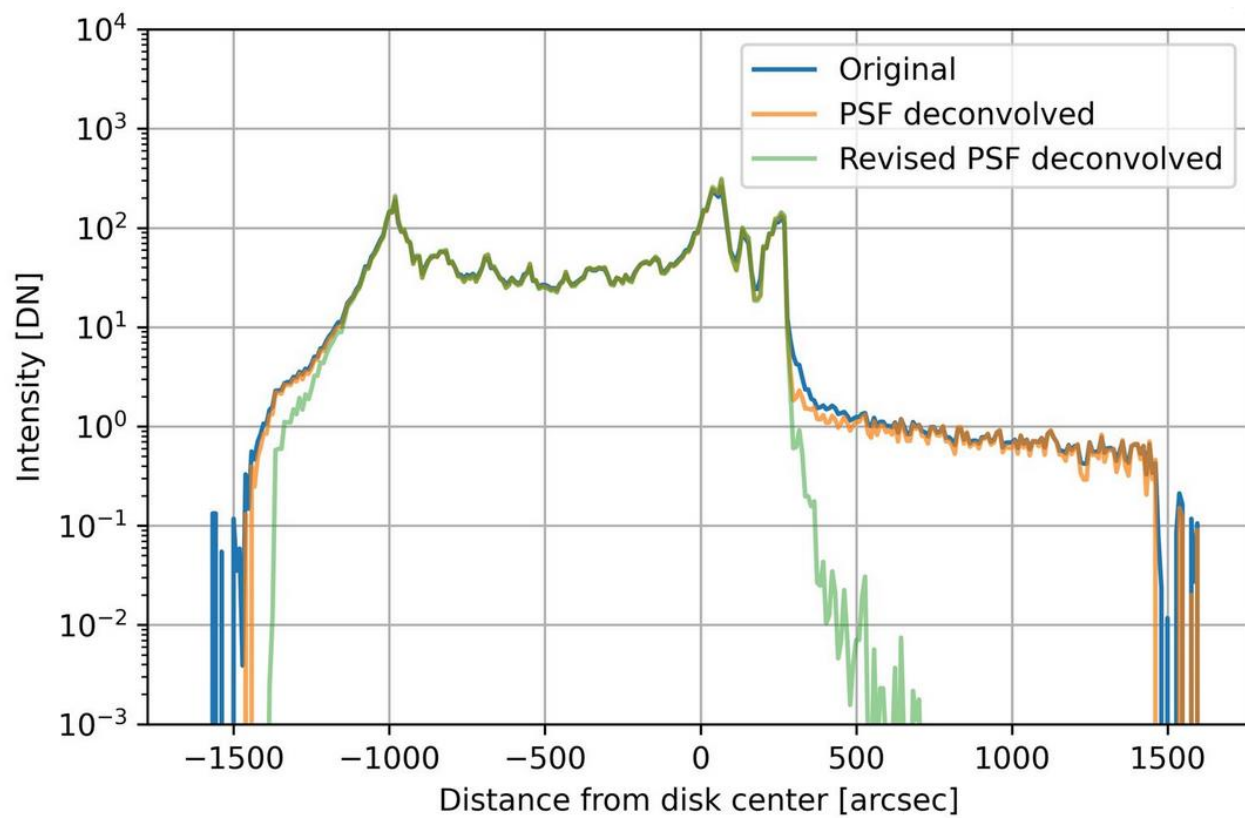
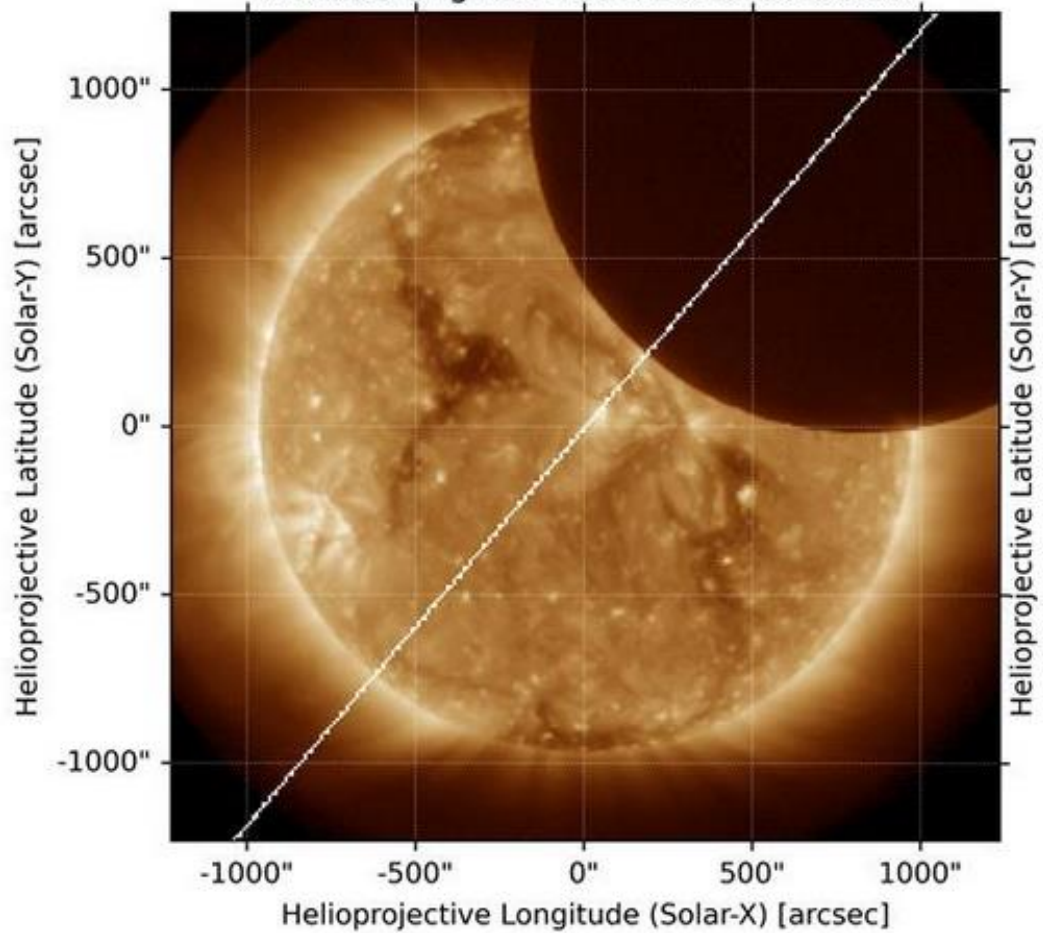


$$I_{\text{occulted}} = \sum_{r,\alpha} \text{psf}_{-r,\alpha} I(r, \alpha) + (1 - \sum_{r,\alpha} \text{psf}_{r,\alpha}) \sum_{r,\alpha} \overline{\text{psf}}_{-r,\alpha} I(r, \alpha)$$

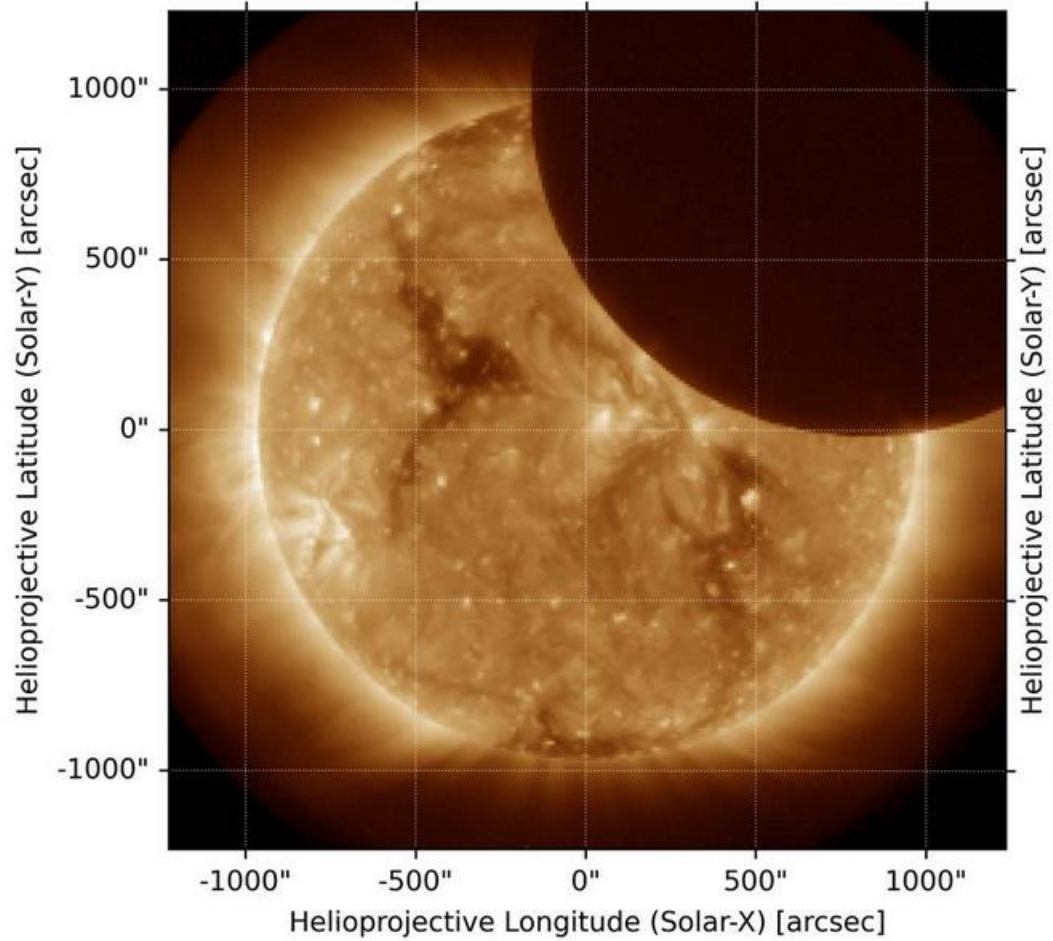
# Results



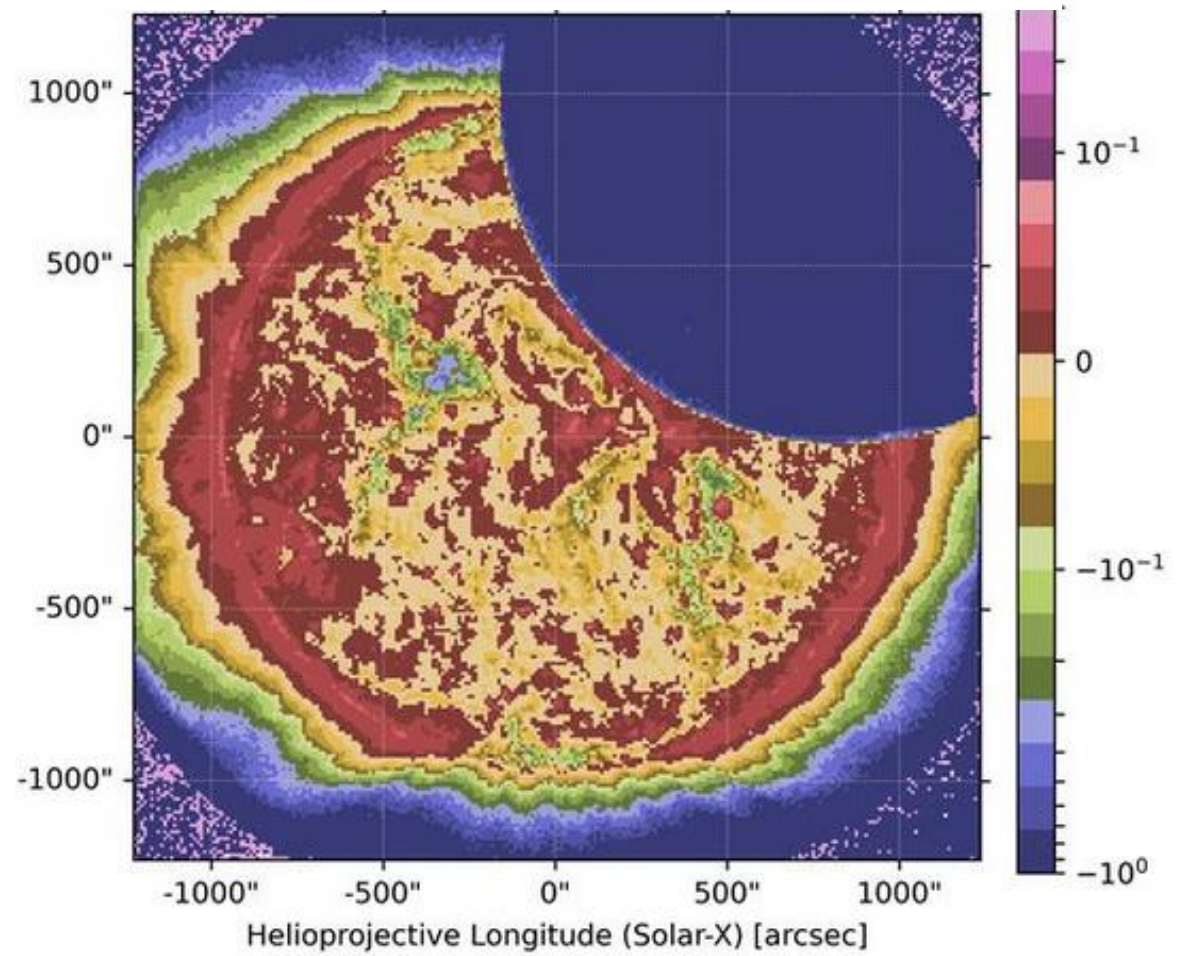
AIA-193 original: 2017/10/19 20:06:06



AIA 193 Å 2017-10-19 20:06:06



Fractional change of the image deconvolved with the revised PSF compared to the original PSF





# Summary

- The PSF of all AIA channels miss about 5% long-distance scattered light
- Has only a slight effect on the quiet Sun and Active Region
- Has a large effect on dark structures, such as coronal holes, coronal dimmings, filament channels, and off-limb structures
  - Intensity further reduces by 30-50% for coronal holes

