

Jim's Gettin' Angry...

Very lucky to witness spectacular aurora on Sept. 4th
Disappointed to find ring artifact in all my images
Are my images ruined?





I'm Not Alone

Common artifact when solar H-α imaging
Much larger radius rings (almost straight)
Often occur when Barlow in front of camera



Daniel McCauley https://flic.kr/p/2jaBa8p Edward Henry https://flic.kr/p/DKTXgC

Florencio Rodil Posada http://florencior.fotoastronomia.net/

Why Me?

Forgot to remove UV (Haze) filter from camera Encountered same problem during July aurora



"The Simpsons", Walt Disney Corp.

DOH

What is Going On Anyway?

Upon closer examination...
Monochromatic light
Flat glass next to curved glass
Same situation in solar images





https://photo.stackexchange.com





Chetvorno - https://commons.wikimedia.org/w/index.php?curid=18571756

Helping for a Change Ring pattern is well behaved & predictable Can be used as a way of measuring curved surface to high precision e.g. telescope optics!



http://www.okotech.com/lp-interference



https://www.cloudynights.com/topic/613124-newtons-rings-on-sp-c102-achromat/page-2#entry8502523

Ring Removal – Attempt #1 Traditional "flat frame" technique Test flats in basement Pattern not reproduced – need monochromatic light?

4700K halogen light, glass diffuser

+ 3nm O-III band-pass filter

Ring Removal – Attempt #2

 Reached out to Paul Klauninger who researched & found FFT technique on solar imaging group

• Use AstroImageJ look for patterns in frequency domain & remover, this and remover by the FMT

Ring Removal – Attempt #3

Create mask & selectively apply tone balance (curves)
Try create mask from aurora images

Too much noise & non-uniformity

Measure rings & create softh firmed in the second second with an informity
Assumed sinuso rate enough + mage non-uniformity





Ring Removal – Attempt #4

Brute force – trade scalpel for sledgehammer!
Simple mask, heavy Gaussian blur, random noise

• Result is ... okay

Rings not visible but aurora detail lost



Conclusions

Beware of situations where Newton's rings may occur
Aurora + filter on end of lens
H-α solar imaging + Barlow or tilted camera
Take necessary action to prevent rings BEFORE they happen
Take the dang filter off Jim!