Resolution of certain flat-field anomalies involving square emission line filters

Richard Crisp
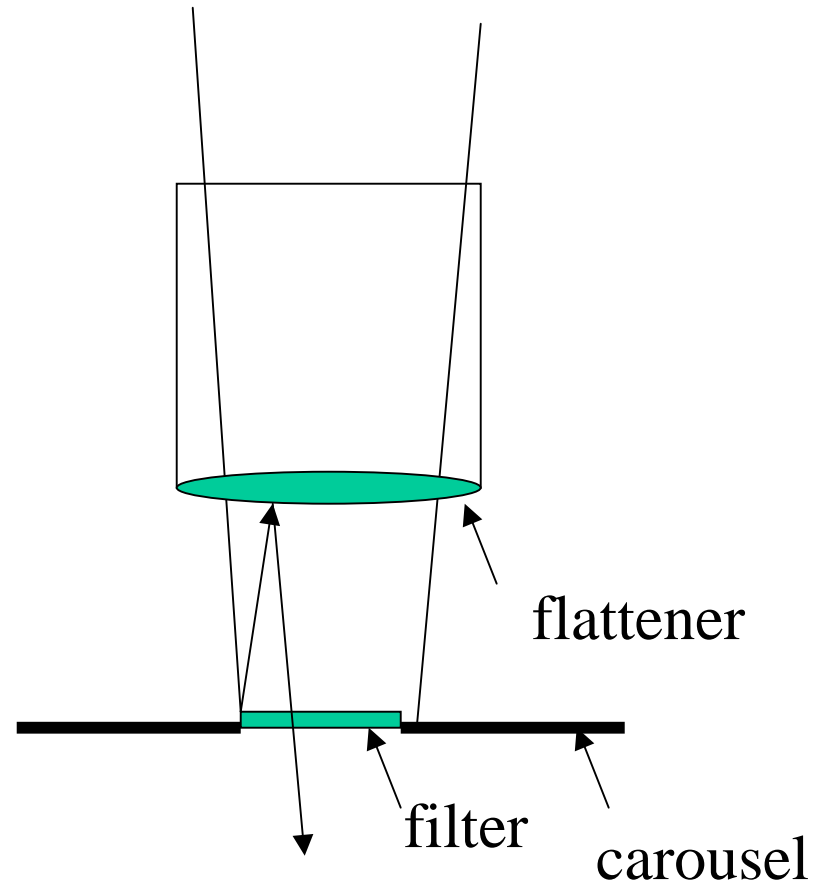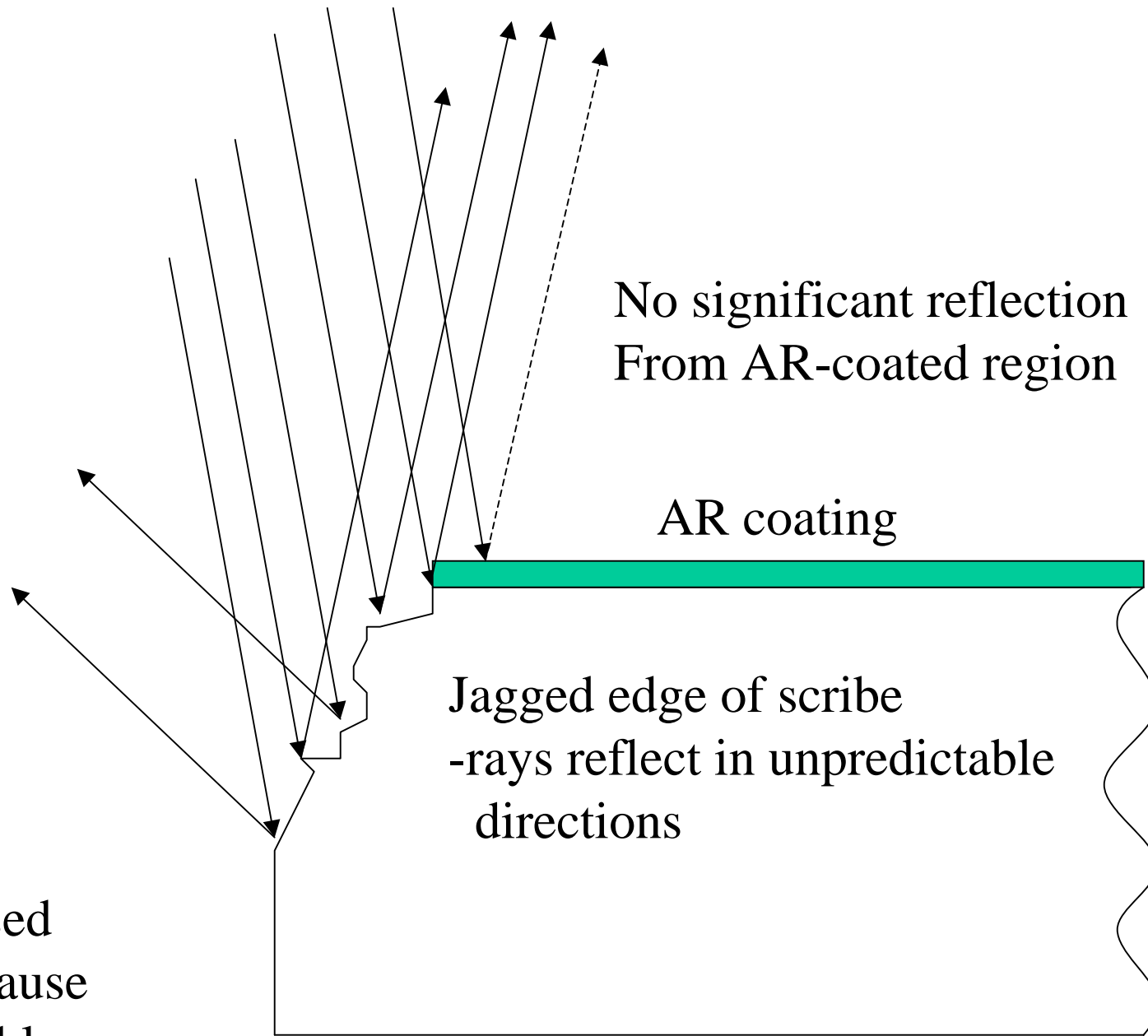
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Description of problem

- Some users have reported anomalous flats when using some square emission line filters

- Anomalies manifested as lined darker and lighter regions in flats: as if tiled

Anomalous flat
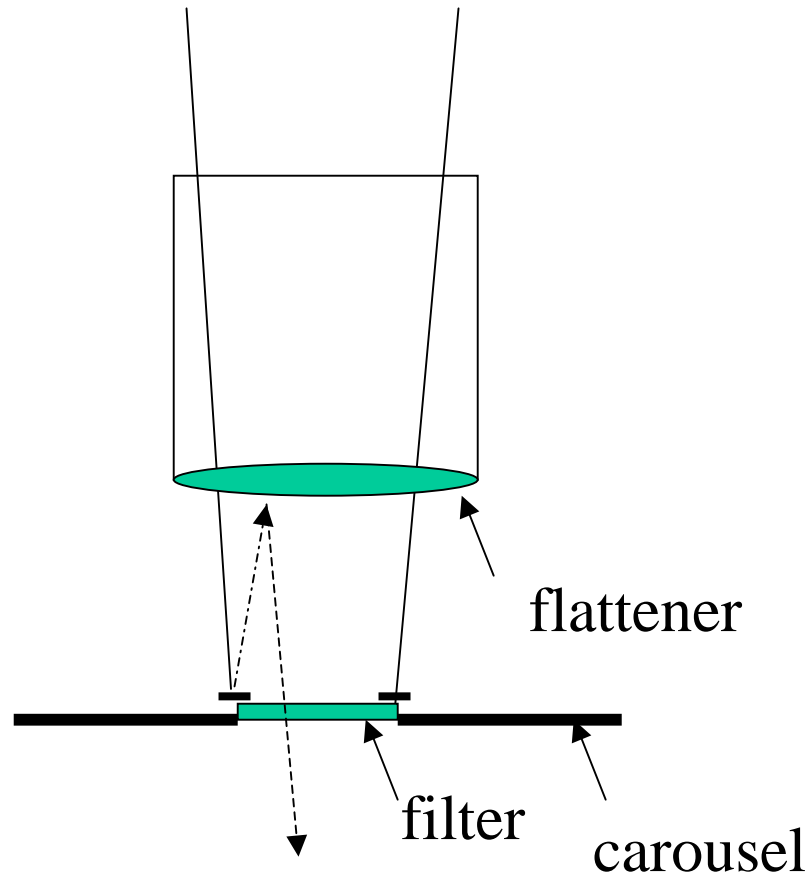Astrodon [OIII] 50x50mm square
KAF16803
TMB180 w/flattener
CFW4-5

flattener

filter

carousel

Theorized cause:
reflection of
passband signal from
Filter edge

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No significant reflection
From AR-coated region

AR coating

Jagged edge of scribe
-rays reflect in unpredictable
directions

Proposed
Root cause
Of problem:
Jagged edge of filter causes reflection of rays
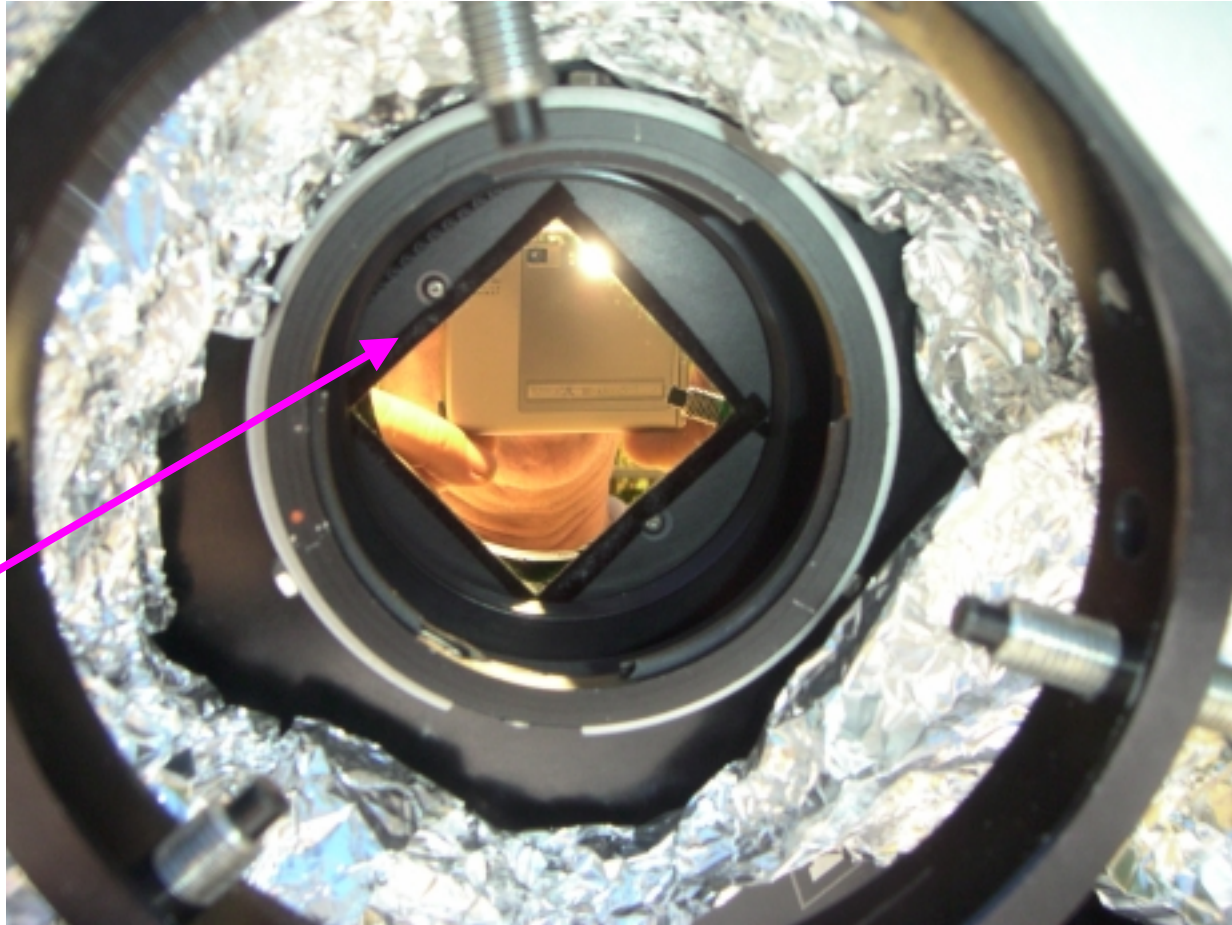
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flattener

filter

carousel

Experiment:
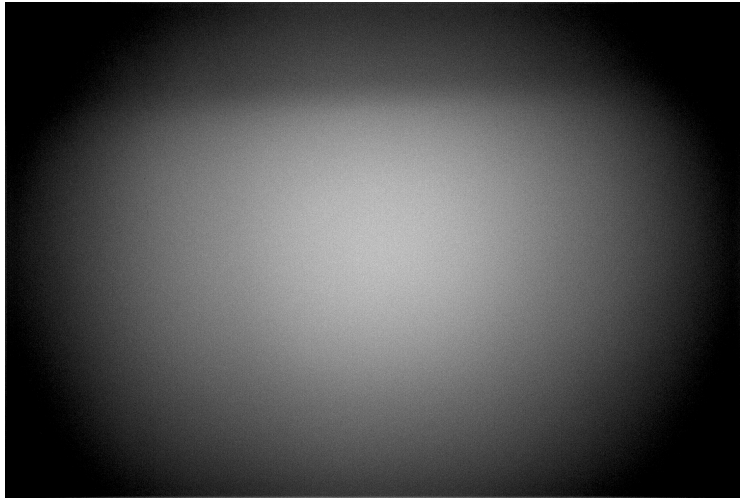4mm wide flocking paper mask
Applied around filter edge
overlapping onto carousel

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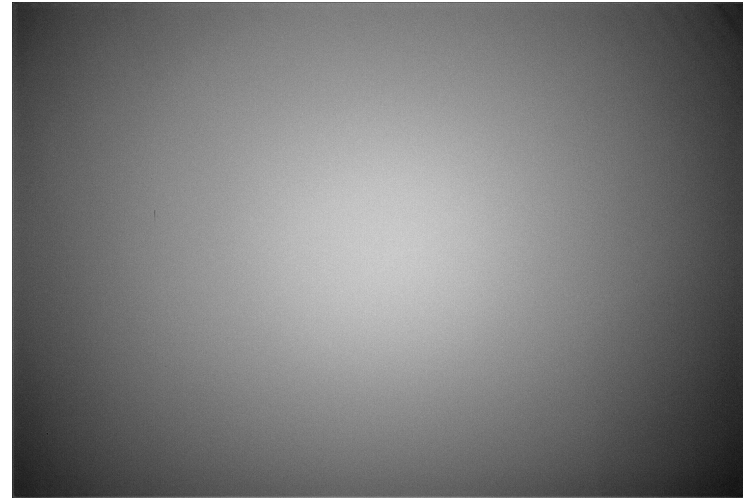Flocking
paper
applied
to interface

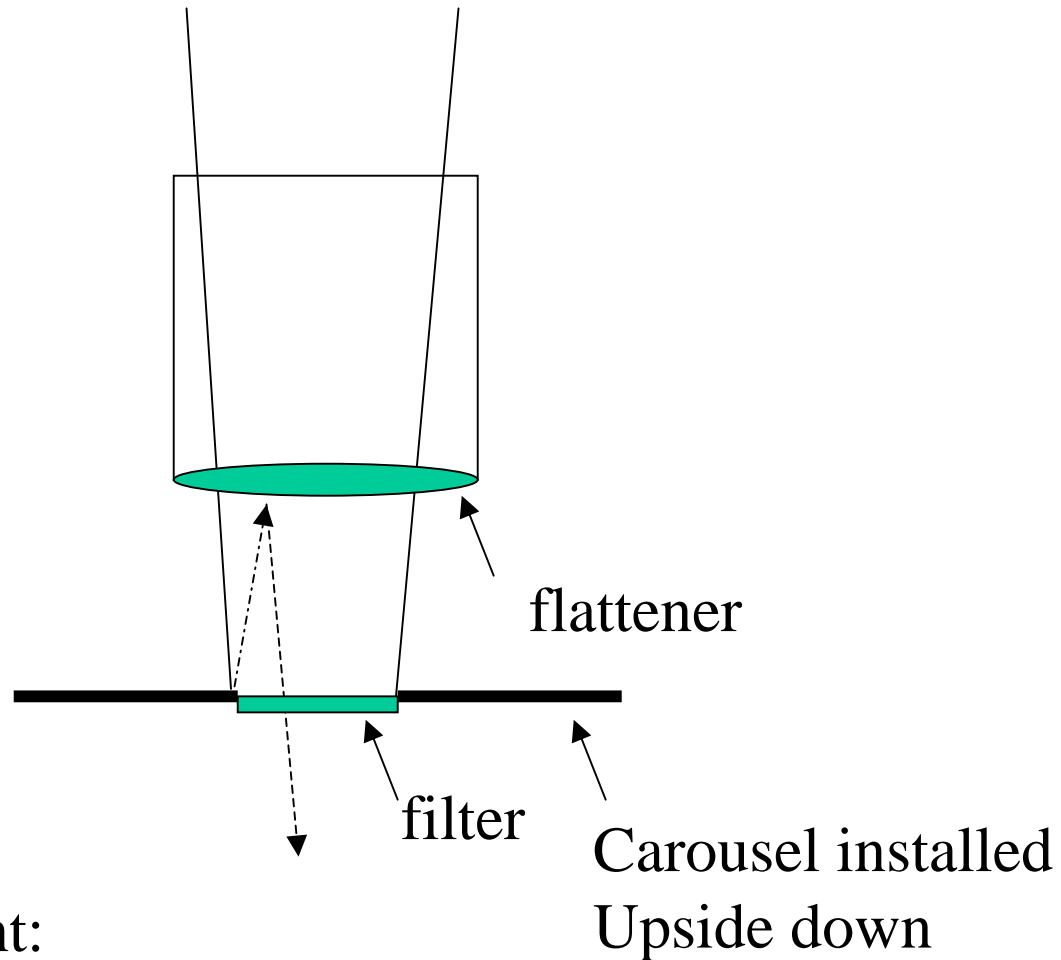Note the brightness of the black anodizing in the light path

Before flocking paper mask
Anomalous flat
Baader Ha 50 x 50 mm square
KAF3200ME, Pentax 200mm
CFW4-5

After flocking paper mask
Non-anomalous flat
Baader Ha 50 x 50 mm square
KAF3200ME, Pentax 200mm
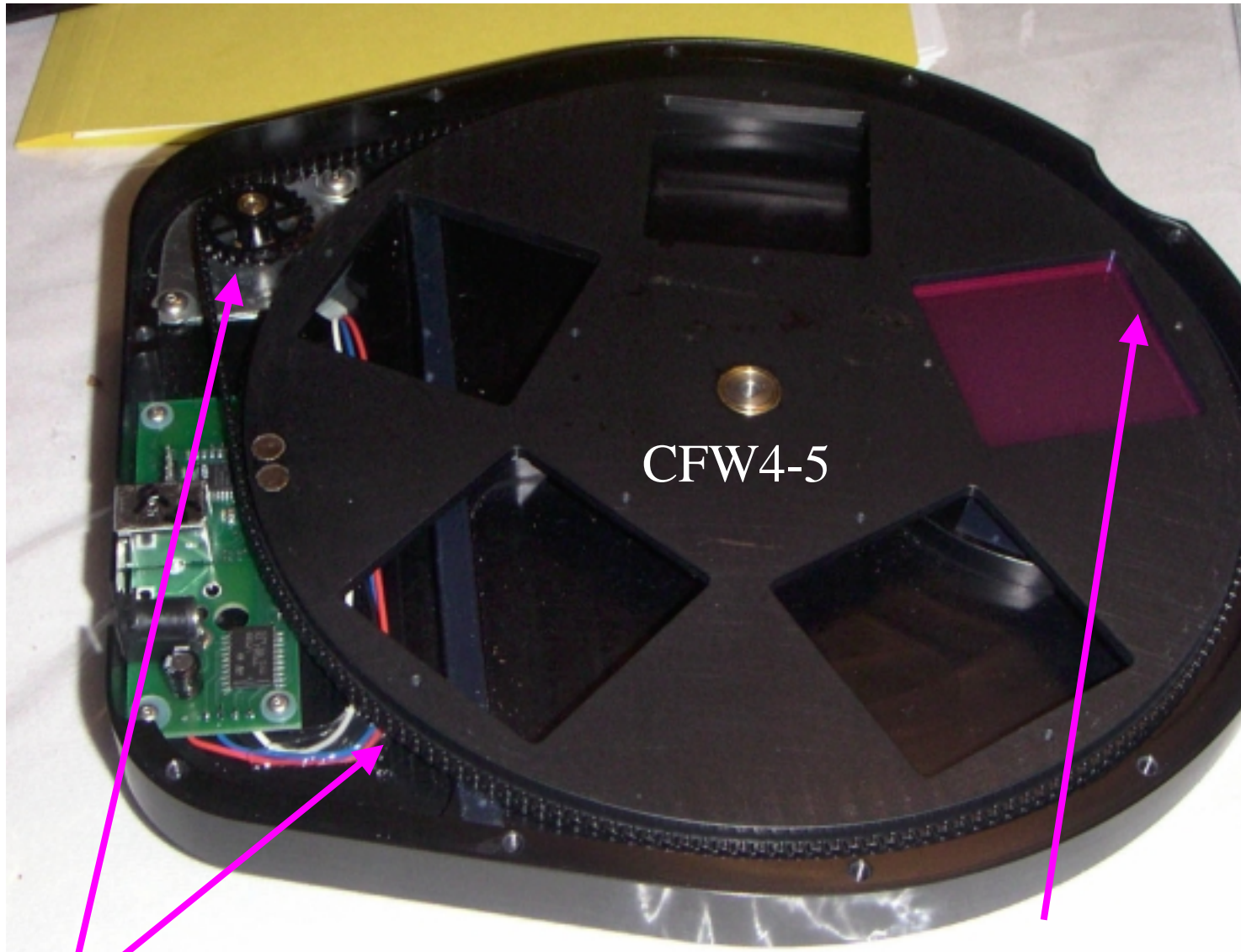CFW4-5

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Next steps

- Flip over carousel to load filters from bottom
  - Carousel pocket provides edge exclusion masking
  - No extra parts required
  - No extra internal clearance required
- Must flip over drive sprocket wheel too

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flattener

filter

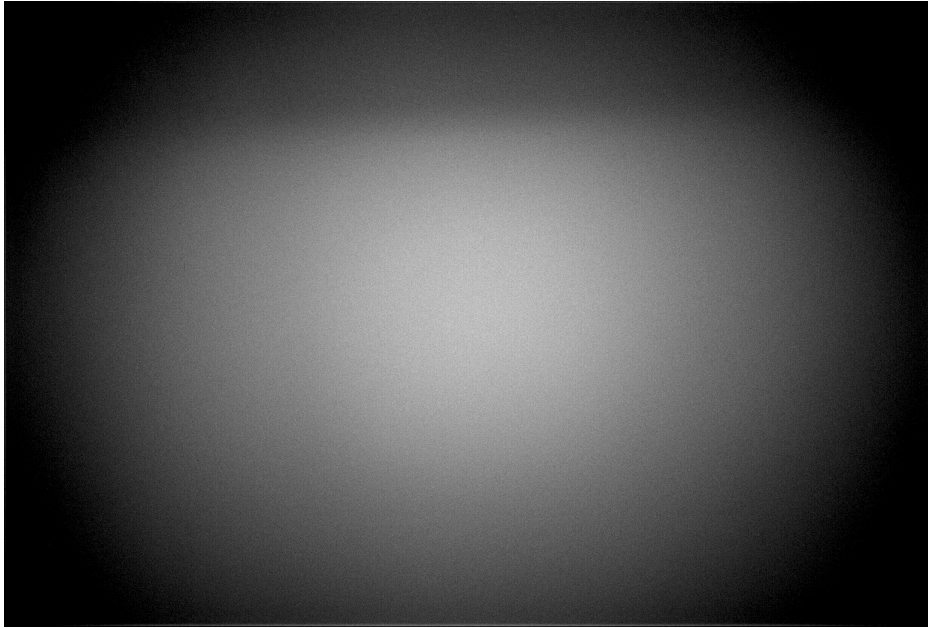Carousel installed
Upside down

Experiment:

Install carousel upside down:
Filters load from bottom side. Provides edge
exclusion masking for free and with no additional
internal clearance requirements.

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CFW4-5
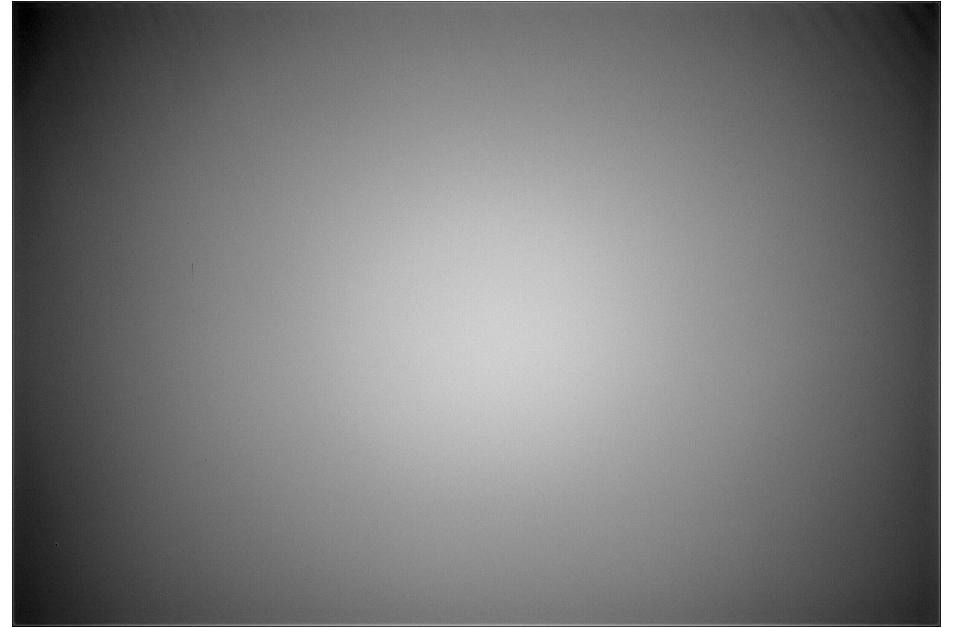
Flip carousel and drive sprocket

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Filter loads from bottom
Gives clean edge! (better
if a knifedge avail)

Anomalous flat
Baader Ha 50 x 50 mm square
KAF3200ME, Pentax 200mm
CFW4-5

Filter inserted from topside with
No edge exclusion masking

Normal flat
Baader Ha 50 x 50 mm square
KAF3200ME, Pentax 200mm
CFW4-5

Carousel inverted, filter inserted
From bottom side. Carousel
provides edge exclusion masking

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Comments

- Cannot leave an illuminated straight filter edge unprotected
  - Need some sort of edge exclusion masking
  - Paint, AR coating, bevel, rounding, mask etc can all work
  - Simplest to install carousel inverted and use carousel bottom as exclusion mask
  - Probably better if knife edge available

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