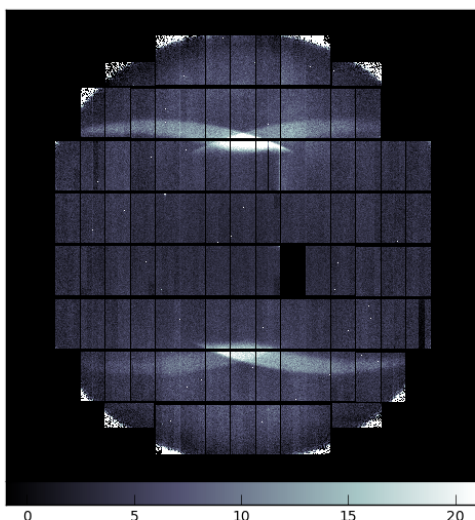


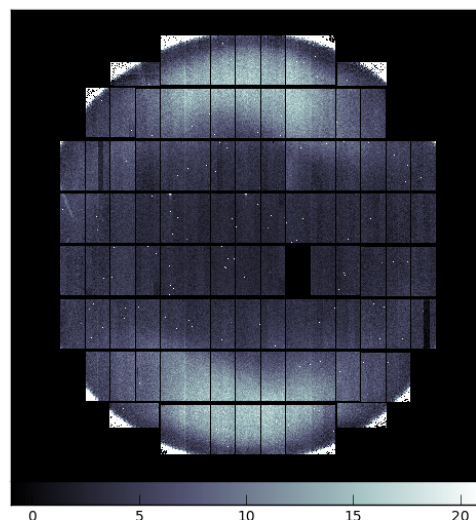
Stray light from the encoder of POpt2 rotator

December 26, 2019
(updated on July 8, 2020)

- A light leak from the encoder of instrument rotator causes stray light on HSC images in the wavelength range of z and Y bands.
- The stray light appears a similar pattern at every 45° of the rotator angle (InR) because eight of the encoder heads are arranged at 45° intervals along the outer circumference.
- **Shielding plates were installed in November 2017.** The stray light level was significantly reduced though the effect still appears on z - and Y -band images.
- Y -band images taken with the dome closed before and after the shielding plates were installed :

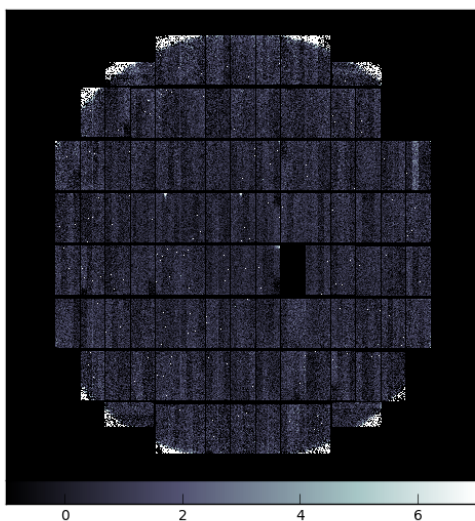


Apr 2017, Y -band, 60 sec, InR = 0°

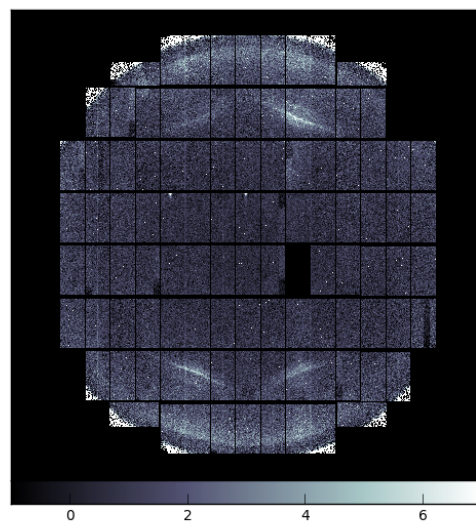


Nov 2019, Y -band, 200 sec, InR = 0°

- $i2$ - and z -band images taken with the dome closed after the shielding plates were installed :

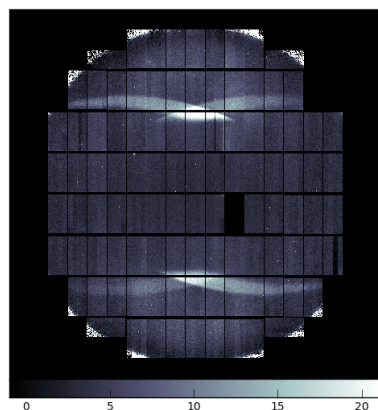


Dec 2019, $i2$ -band, 200 sec, InR = 0°

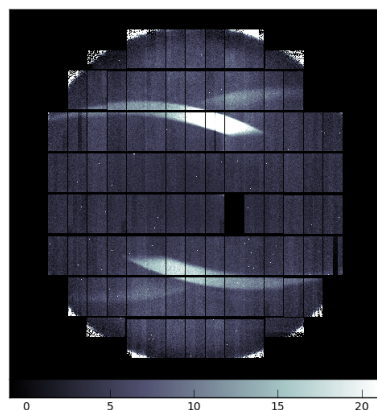


Nov 2019, z -band, 200 sec, InR = 0°

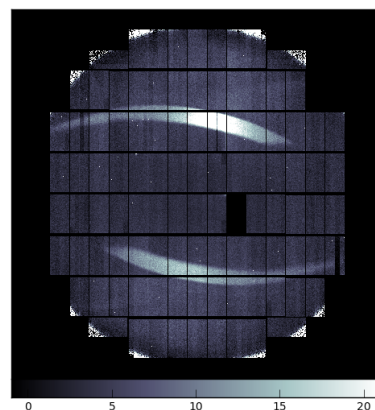
- Y-band images with 60 sec exposure in 2017 Apr (before the shielding plates were installed) :



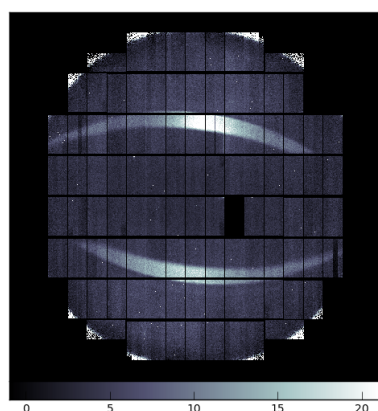
Rotator angle = 0°



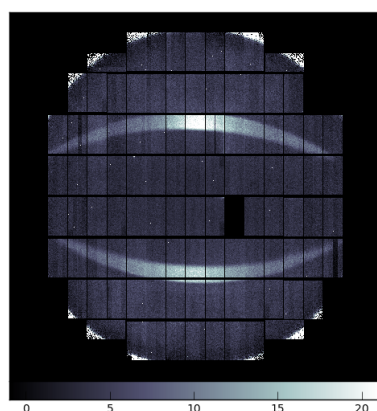
Rotator angle = 5°



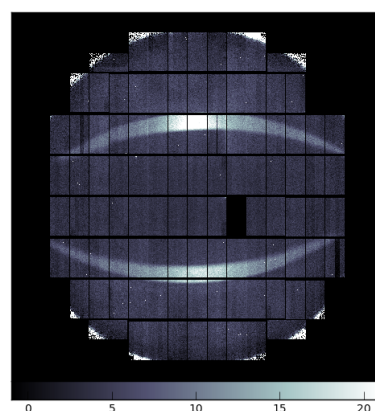
Rotator angle = 10°



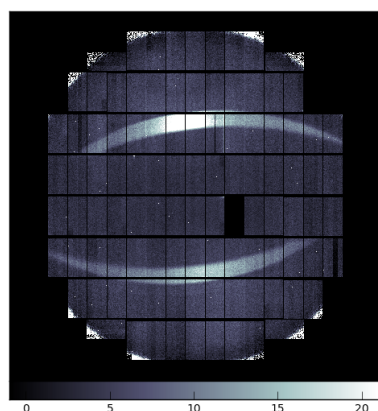
Rotator angle = 15°



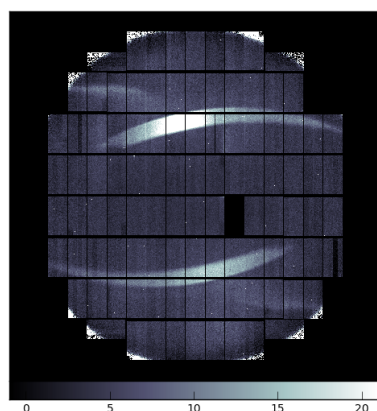
Rotator angle = 20°



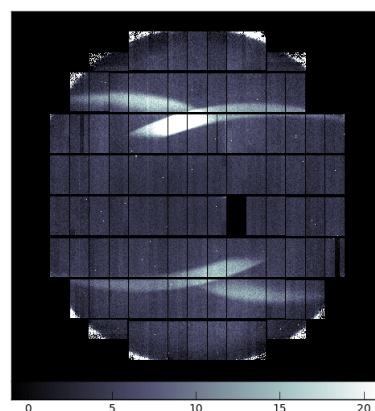
Rotator angle = 25°



Rotator angle = 30°

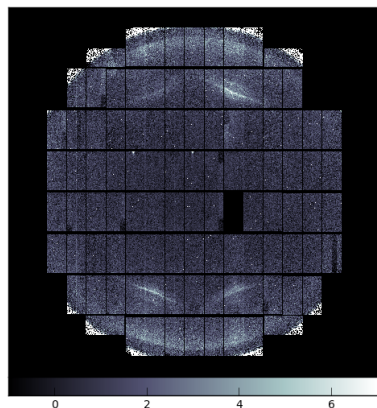


Rotator angle = 35°

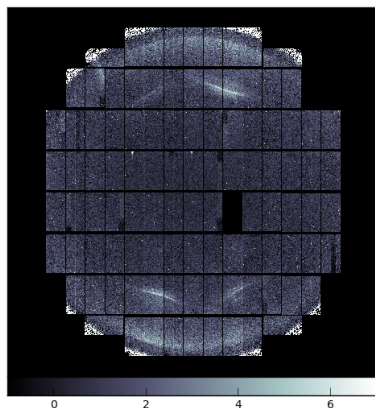


Rotator angle = 40°

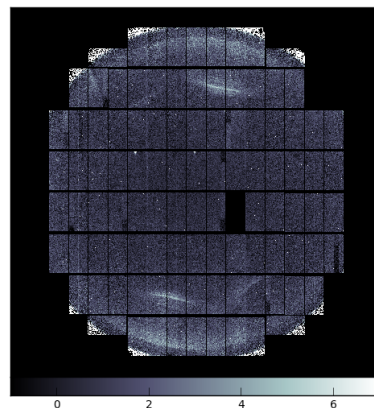
- z -band images with 200 sec exposure in 2019 Nov (after the shielding plates were installed) :



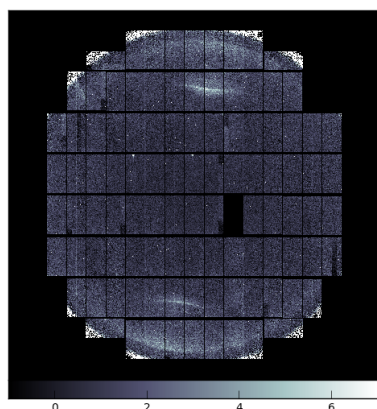
InR = 0°



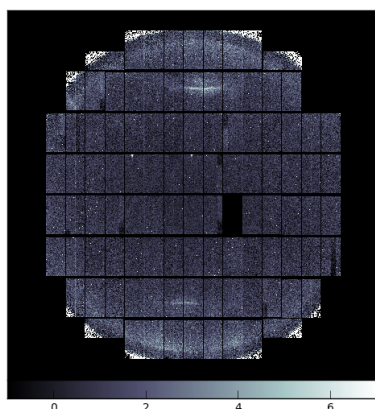
InR = 5°



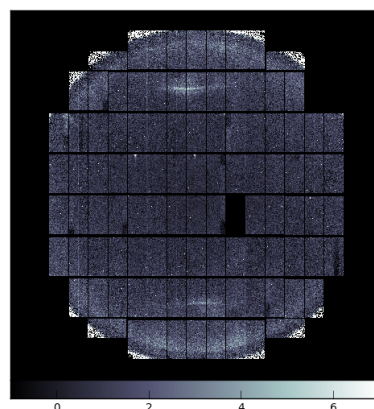
InR = 10°



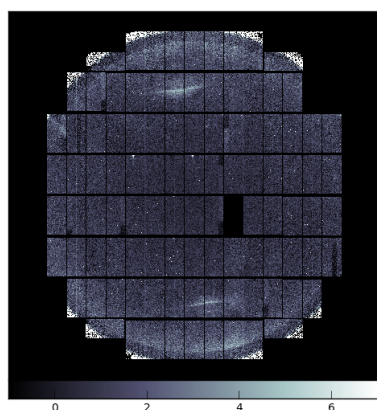
InR = 15°



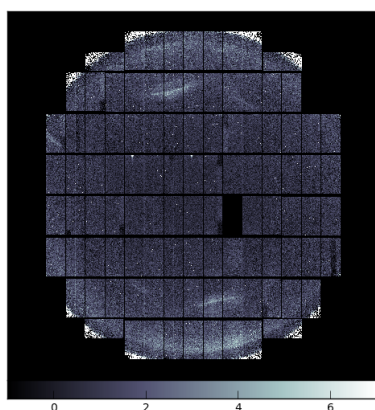
InR = 20°



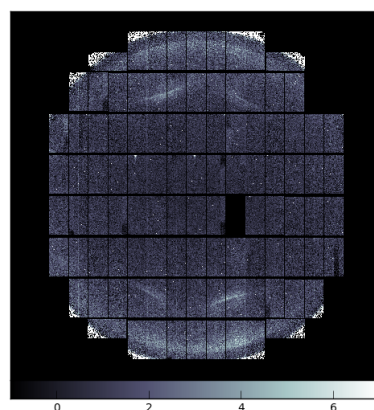
InR = 25°



InR = 30°

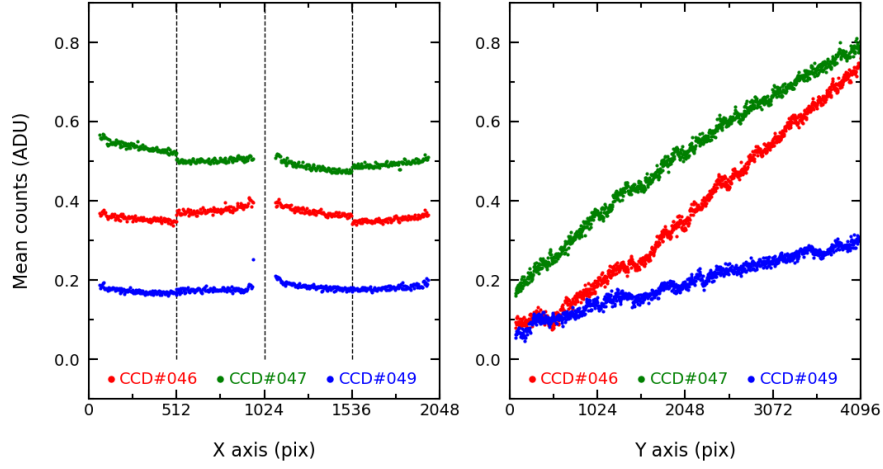


InR = 35°

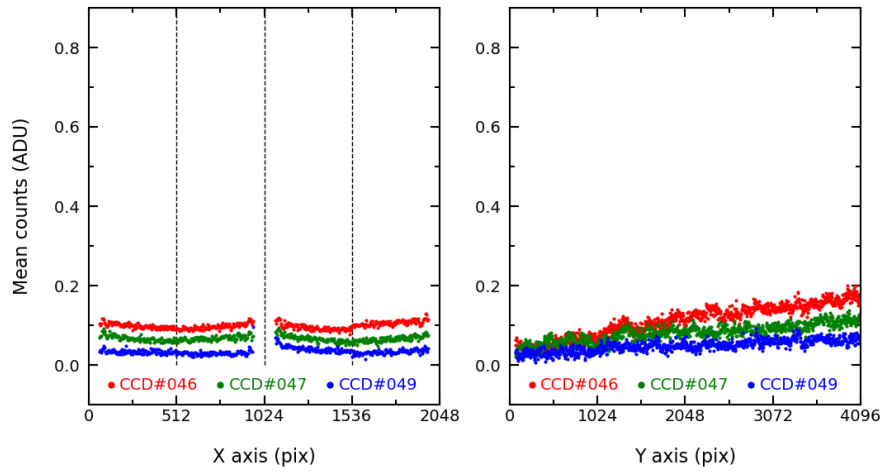


InR = 40°

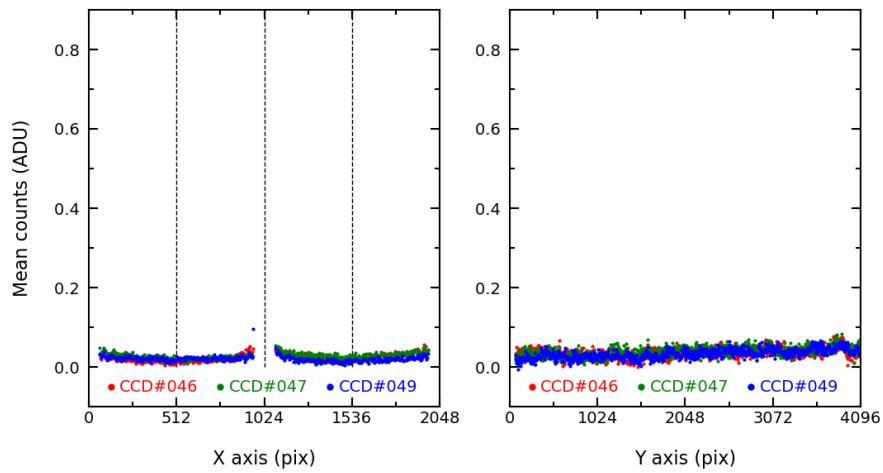
- The stray light is also collected on the CCDs during the readout process.



The count profile of overscan-subtracted bias data in the Y band



The count profile of overscan-subtracted bias data in the z band



The count profile of overscan-subtracted bias data in the g band