CoRot Imagette pipeline

- Written by C. Chardes, R. Den Hartog, R. Cautain, L. Jorda and P. Chabaud

My contribution:

- Test robustness and increase efficiency
- Adapt the pipeline to work for saturated stars

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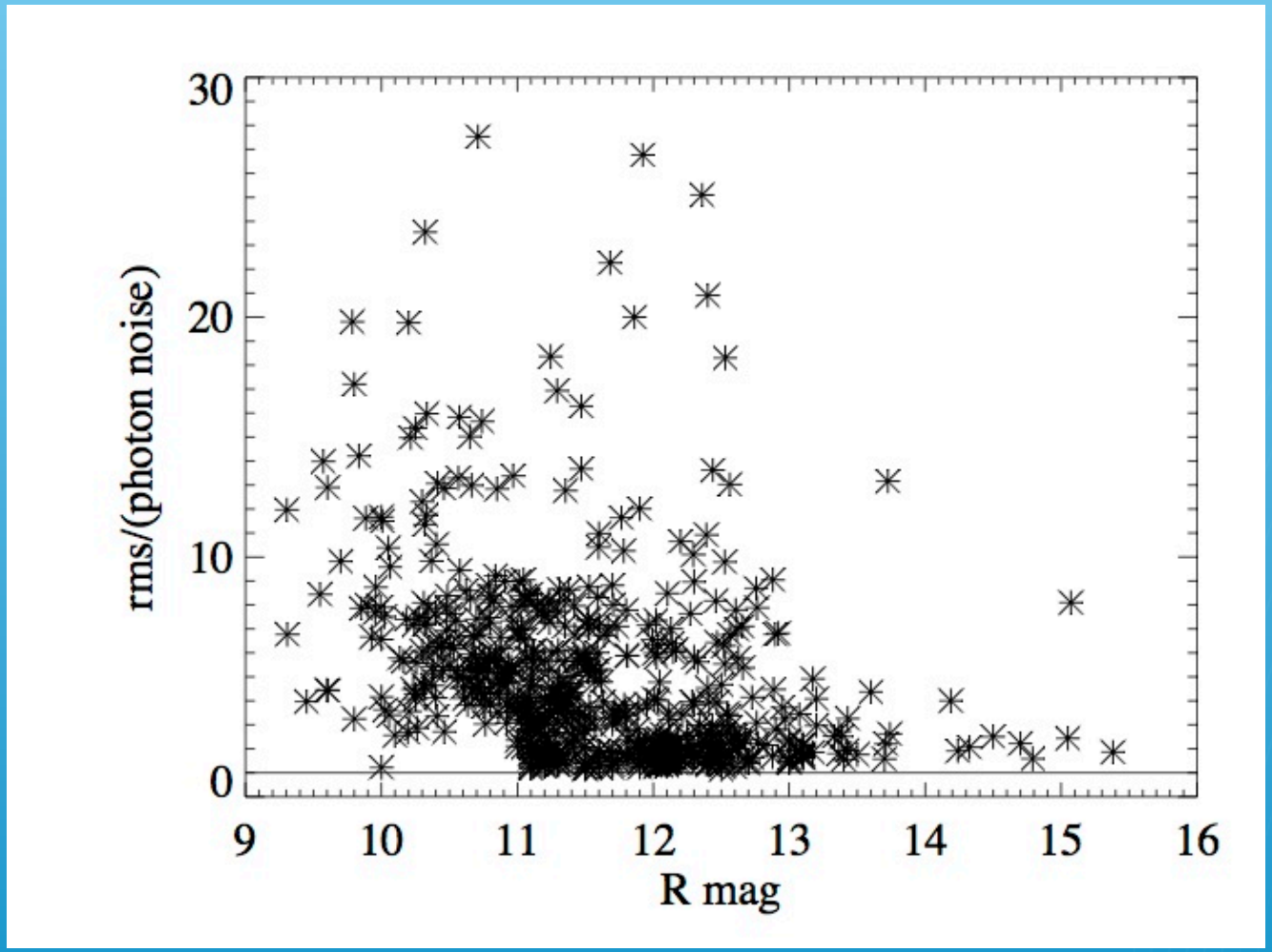
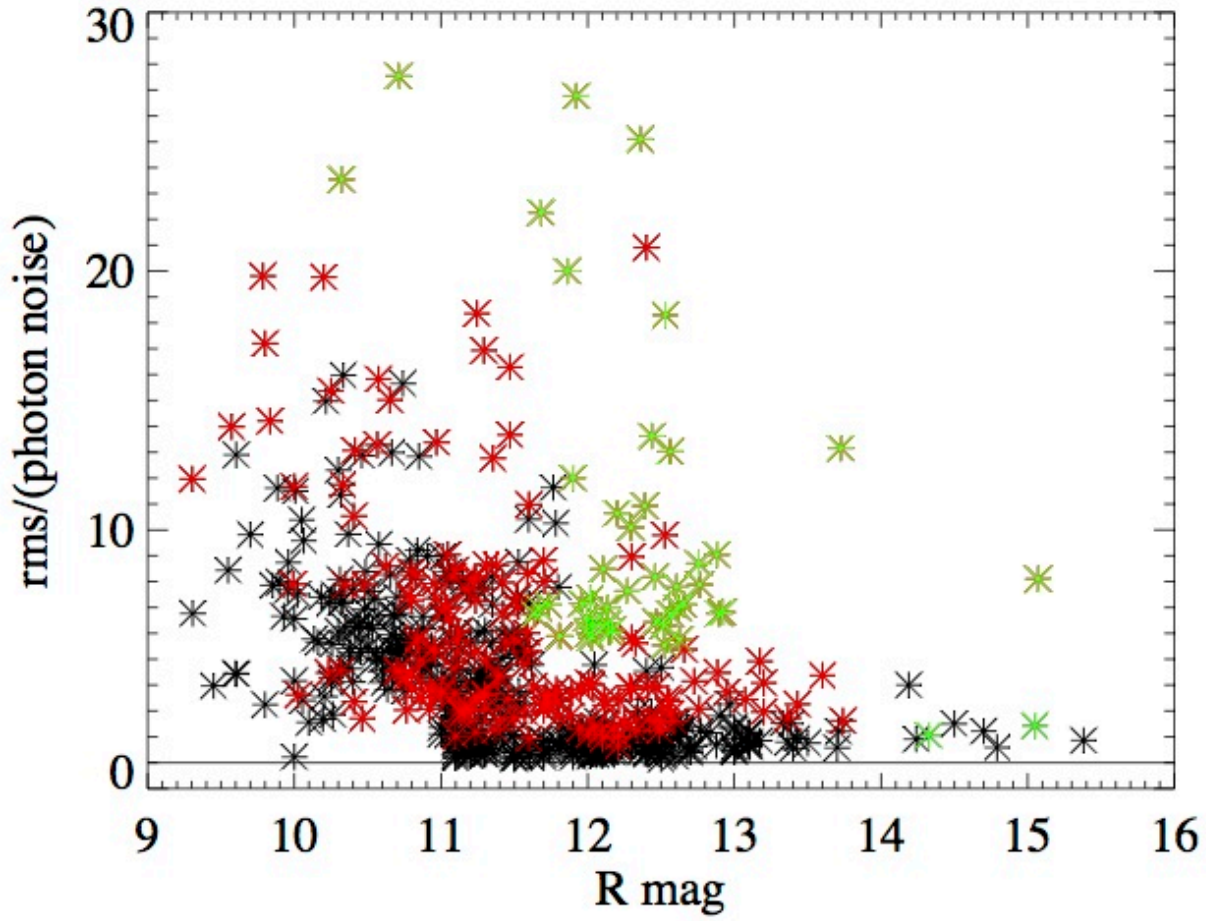
Noise test N2 LC product



Runs:
IRa01 LRa01
LRa02 LRa03
LRa04 LRc01
LRc02 LRc03
LRc04 LRc05
LRc06 SRa01
SRa02 SRa03
SRc01 SRc02
SRc03

633 stars

Intrinsic stellar variability- N2



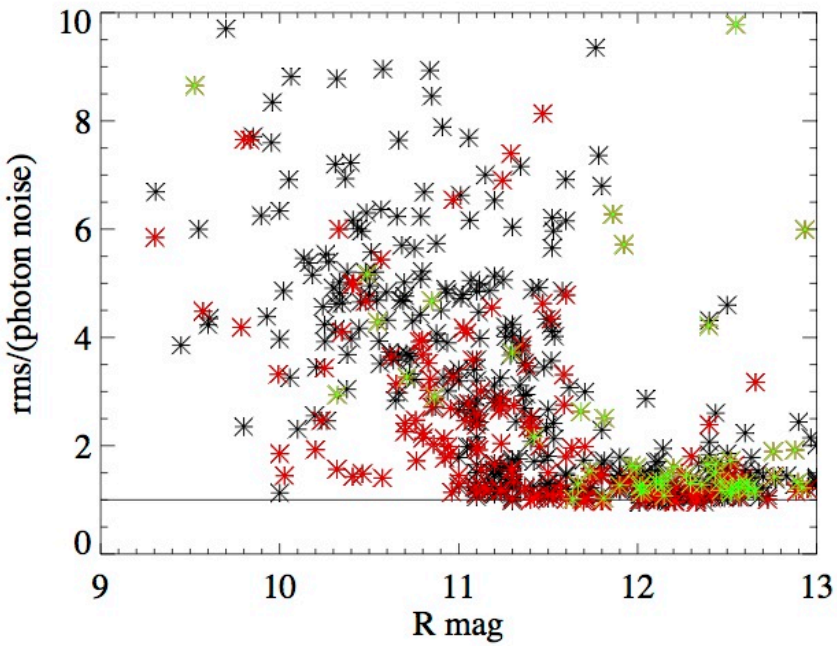
Running Mean
30 minutes

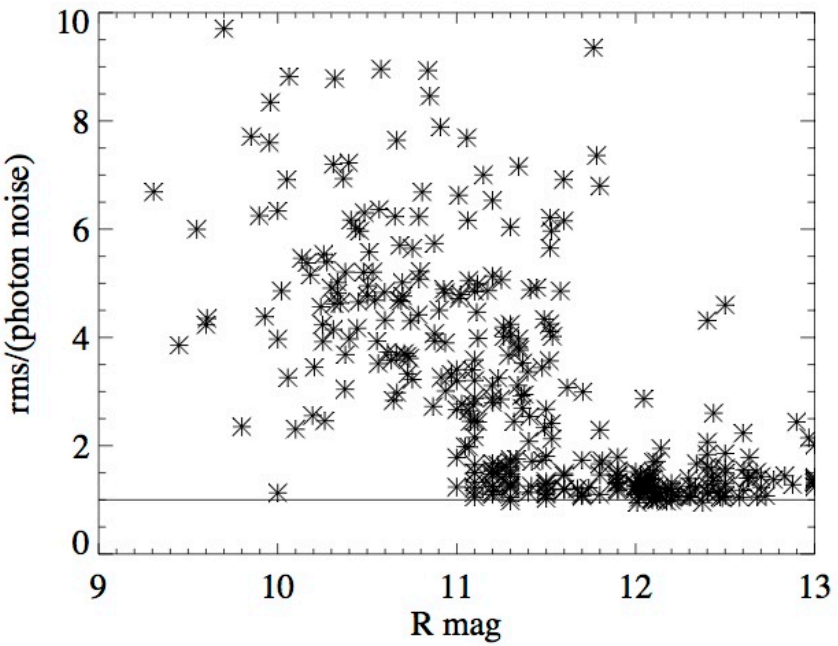
$$\frac{rms\_median}{rms\_total} \geq 0.8$$

Amplitude > 5%

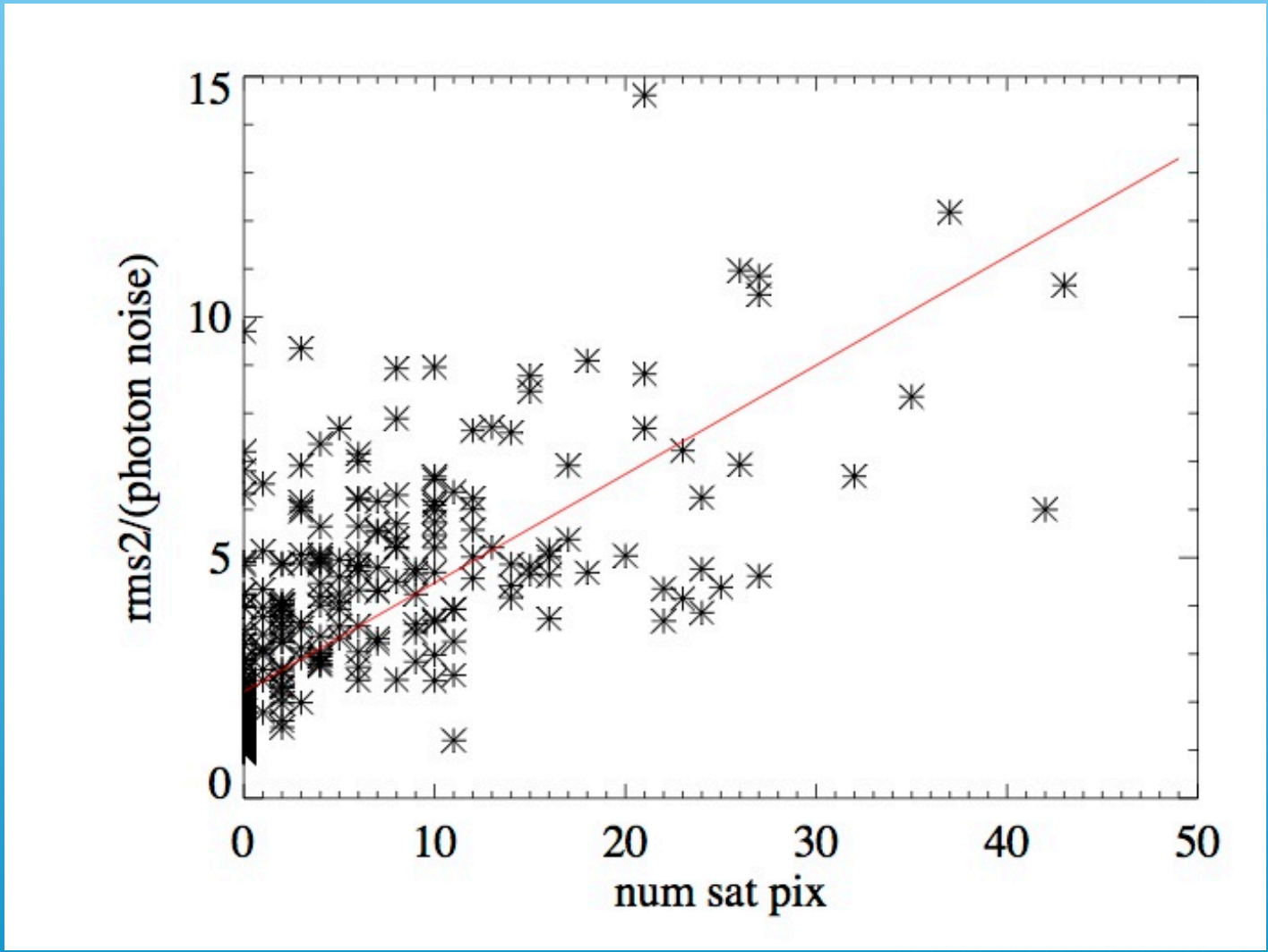
Remove stellar variability – Saturation

Filtered data

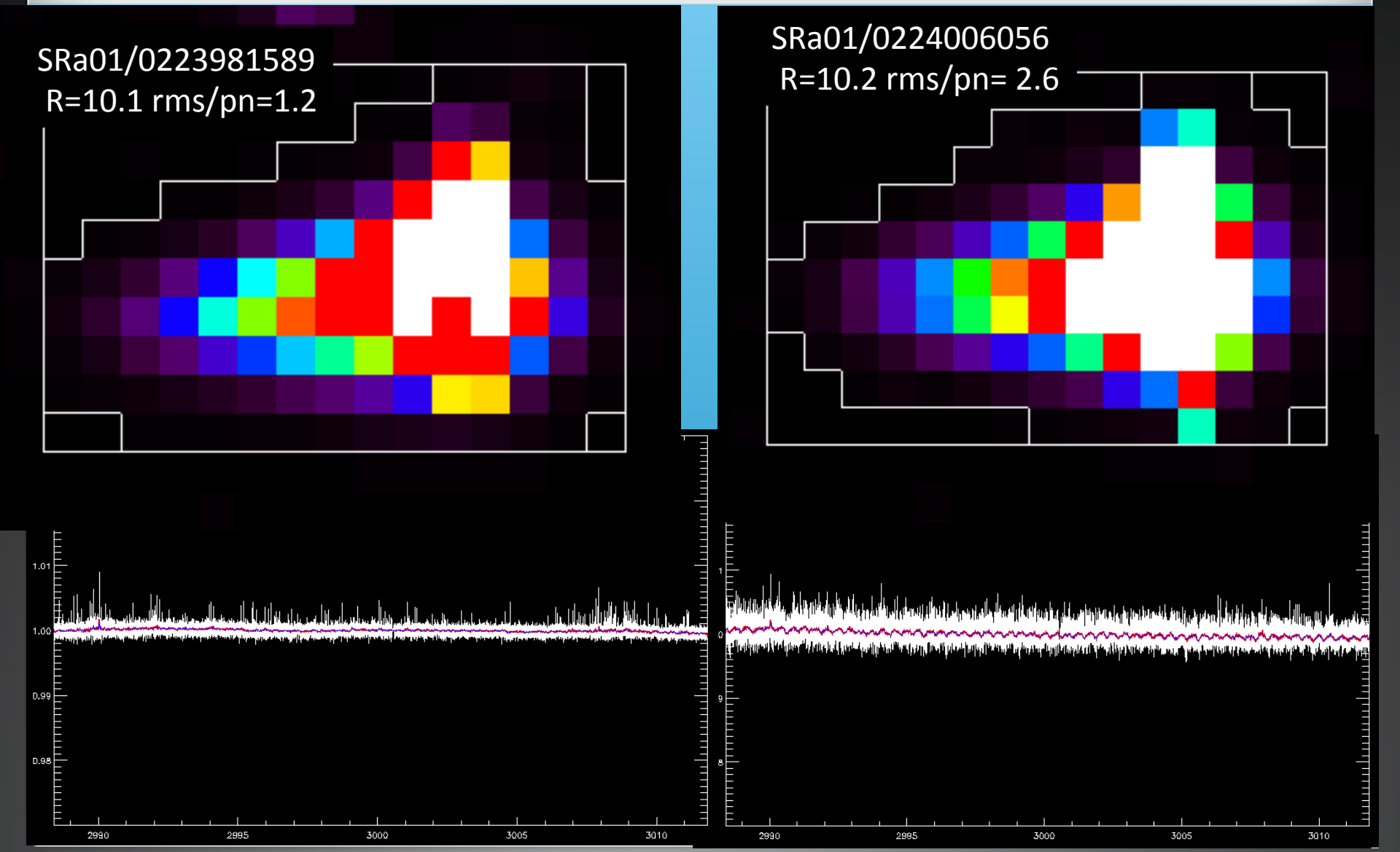




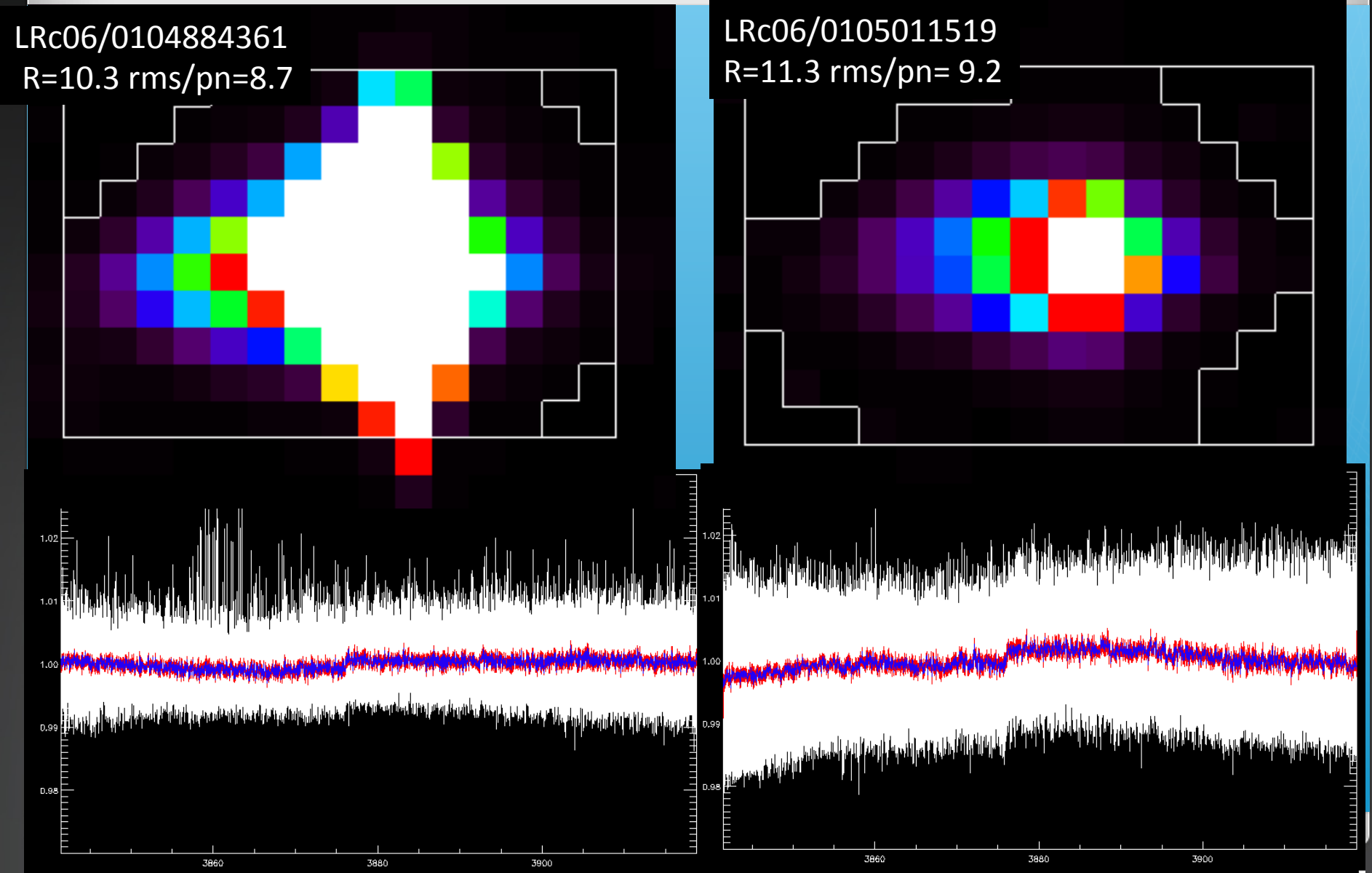
Number of saturated pixels – N2



Saturated – low noise – N2



Saturated increase of white-noise



Possible causes

- Non linearity of the CCD close to saturation. Preliminary analysis shows that noise is proportional to number of saturated pixels. However, there could be other causes.
- Loss of flux outside the imagette – test if there is significant loss of s/n if we decrease the mask by 1 pixel. Preliminary test show that this is not important.
- Problems with centroid determination due to saturation or contamination.
- ???

Pipeline Code

- Removes South Atlantic anomaly affected data
- Removes cosmic-ray affected data
- Flags contaminants (blends) – Needs improvement
- Flags hot pixels – Needs to be validated
- Flags saturation – improve detection and flagging of saturated pixels
- Determine the photometric mask – improved by Benjamin Gardes
- Determine the centroid- centroid curves will be provided
- Photometry

Conclusion

- Check pipeline step by step - on going.
- Imagettes pipeline is working well for non-saturated stars.
- It also works well for some saturated stars but the majority of saturated stars have higher white noise than expected.
- Improved the detection and flagging of saturation in the pipeline.
- Centroid curve will be provided.
- Investigate specific cases of light curves with high noise.
- Investigate color dependency.