Towards a GSC2 global photometric calibration

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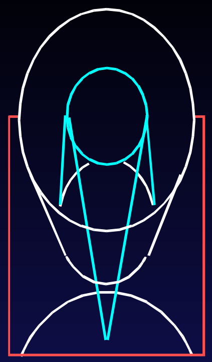
Towards a GSC2 global photometric calibration

- Overview about photometric calibration:
  - Non linearity of the photographic emulsion
  - Non uniformity of the emulsion and difference in the plate development
  - No standard reference
  - Extrapolation
    - Bright end
    - Faint end
  - Vignetting
    - Not enough data available to determine the characteristics
    - Unclear interpretation from the previous the results



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- Experiment design
  - Get a full plate CCD data for one equatorial field (region covered by both Schmidt cameras) in at least 2 band pass for a medium galactic latitude field
    - Instrument 36 inch telescope (KPNO) + CCD Mosaic array (59'x59')
    - At least 3 photometric nights (7 frames x 7 frames x 2 band pass x 4 minutes)
  - Reduction data
    - Dedicated PC running LINUX
    - MSCRED from IRAF and APPHOT
    - About 20 GB per clear night
  - Results
    - Reference catalog of ~2500 stars by square degree as fainter as 19^{th} in V magnitude

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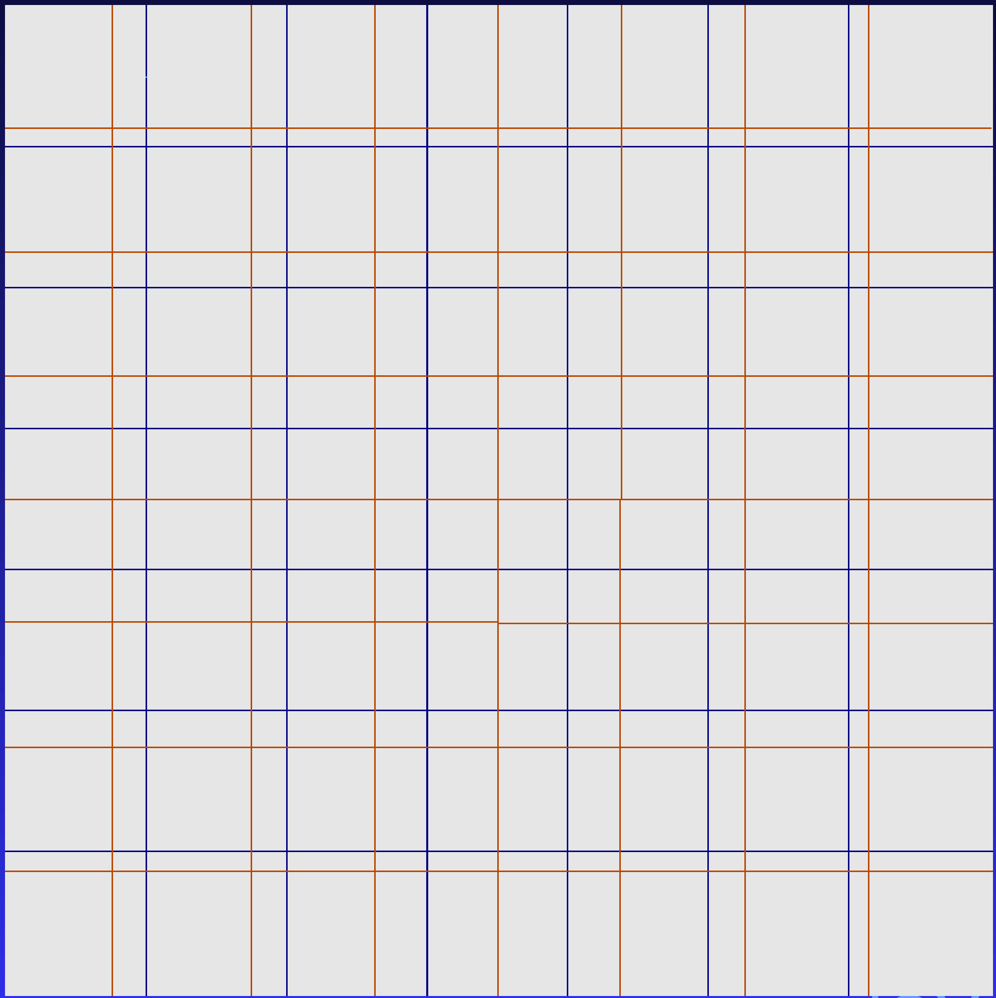
- The blue grid are 55’ x 55’ (used by the telescope pointing)
- The red grid 48’ x 48’ (used for plate calibration, photosol and apply_calib)



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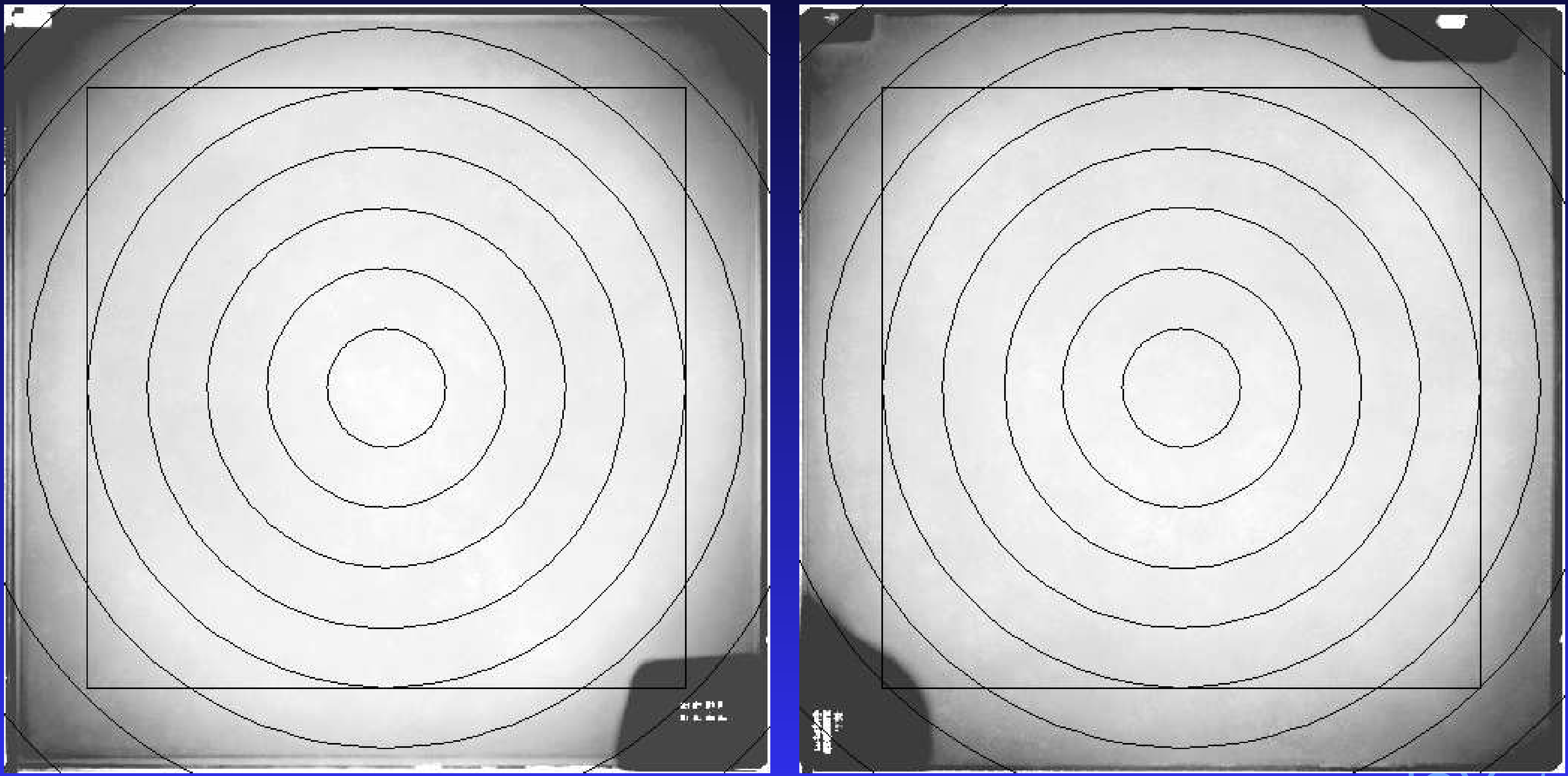

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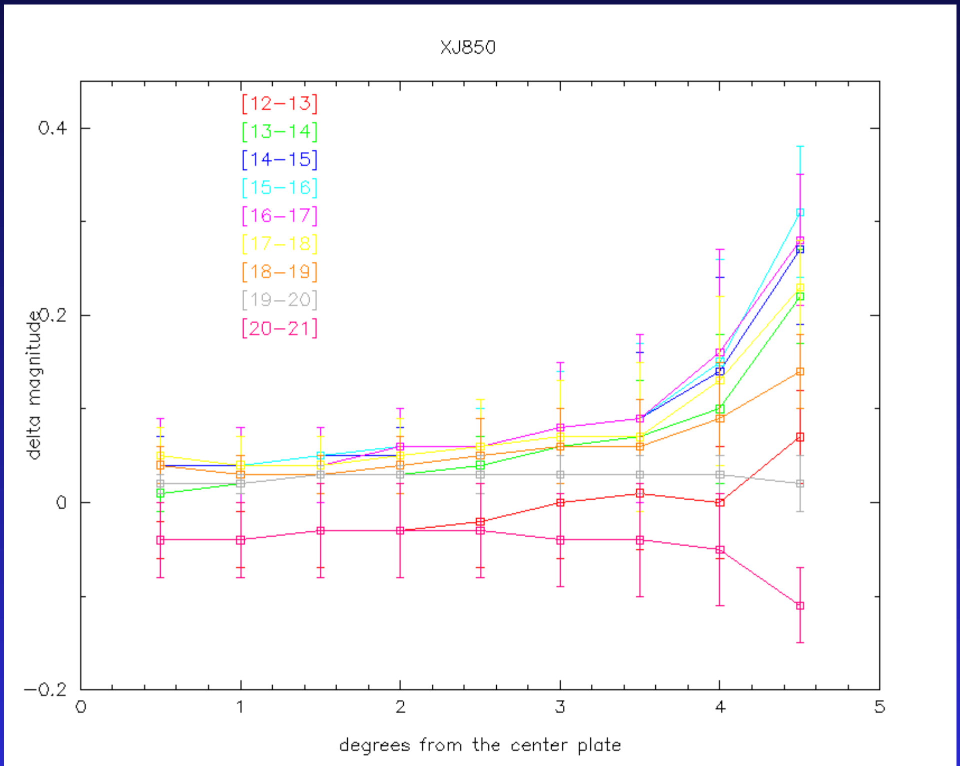

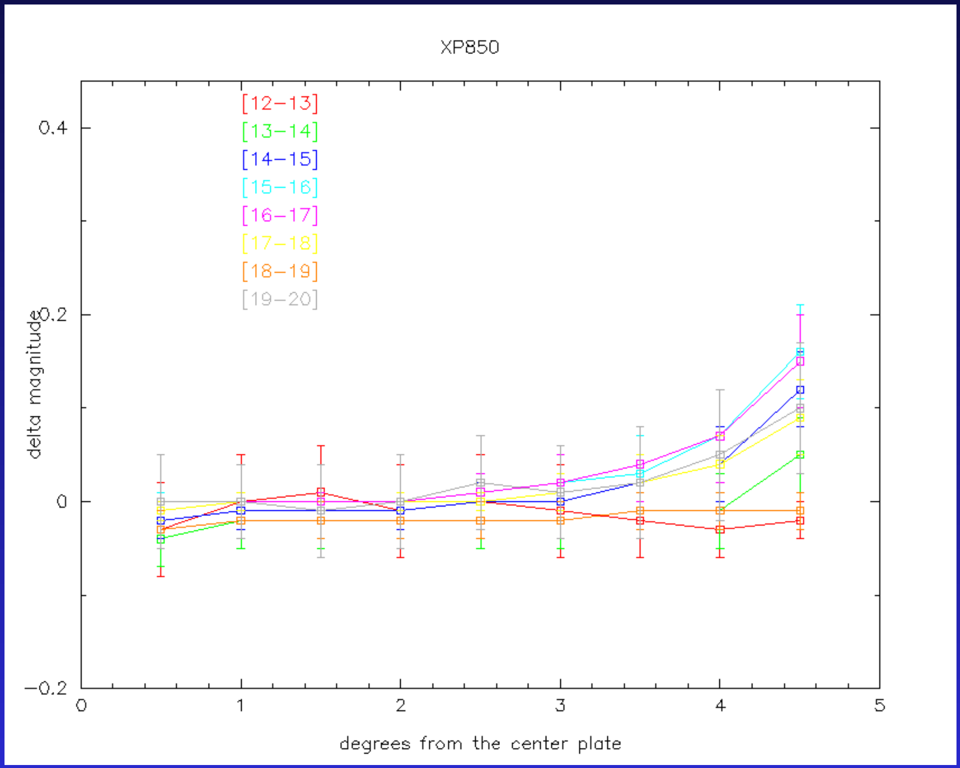

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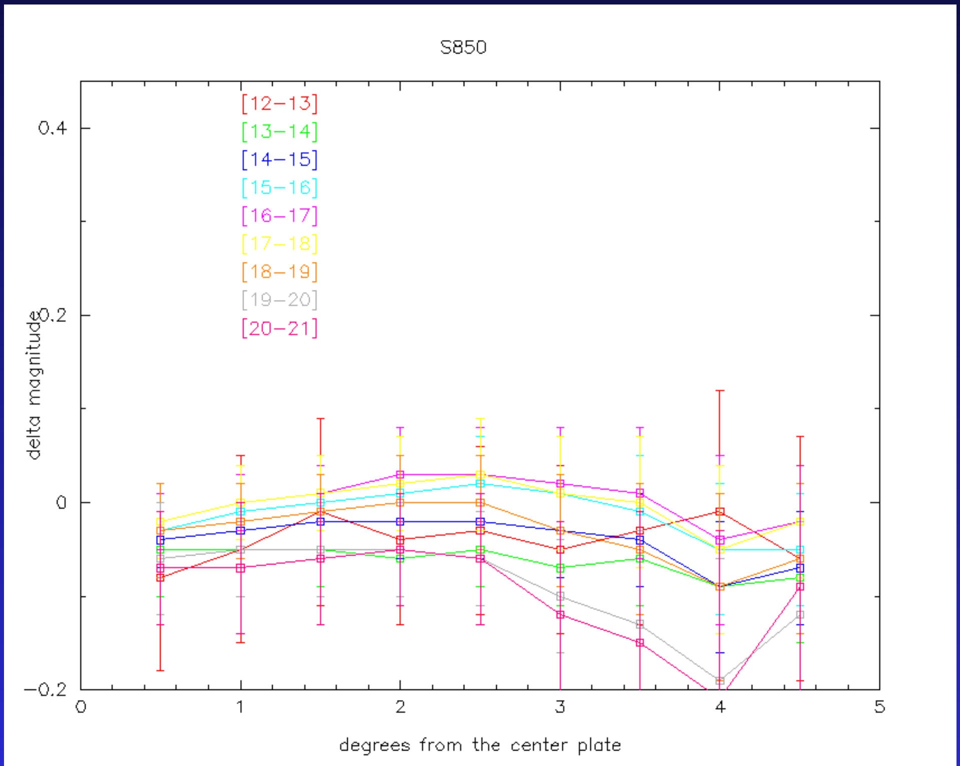

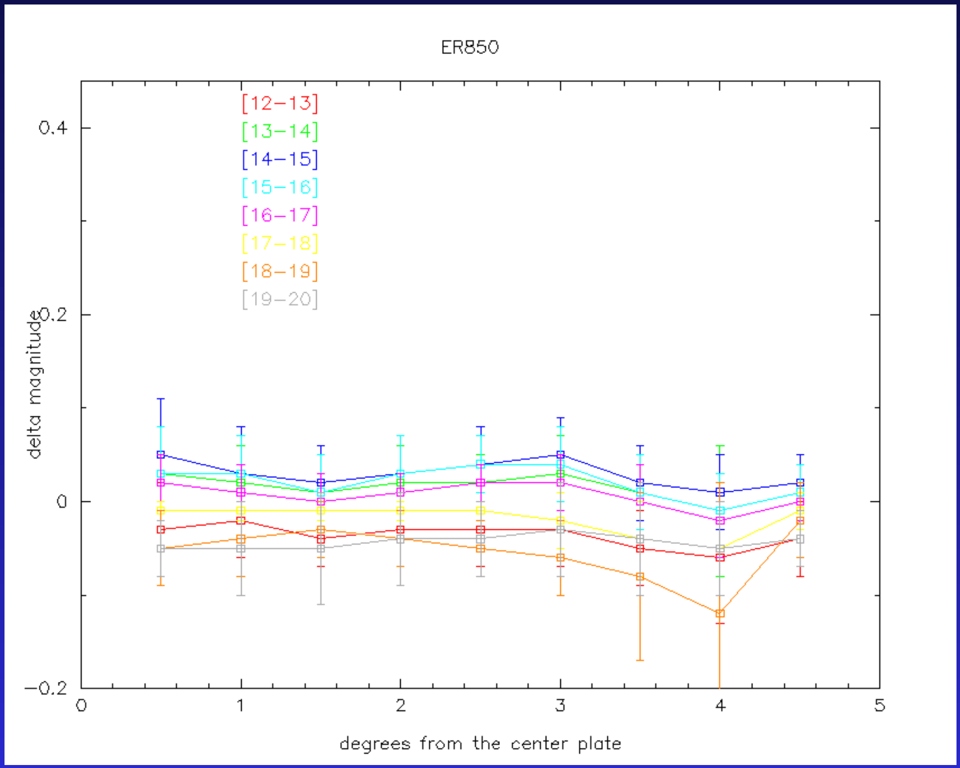

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- Correction magnitude mask is a
  - Function of the position on the plate (x,y)
  - Function of the magnitude
  - Function of the color
  - Function of the telescope
- Procedure
  - Get a correction for instrumental magnitude what is the physical parameter what it's changing
    - Log_{10} (Integrated density)

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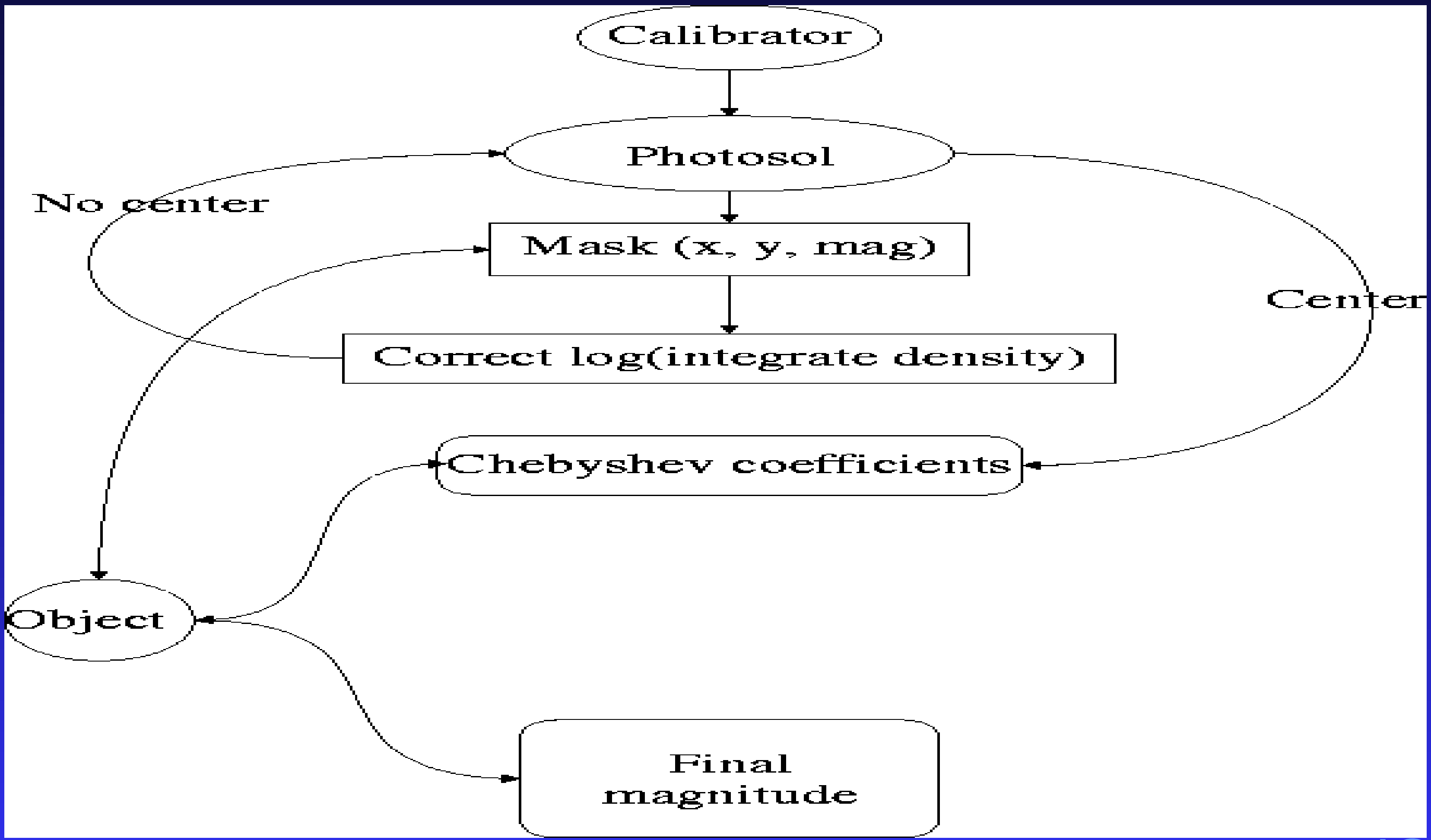

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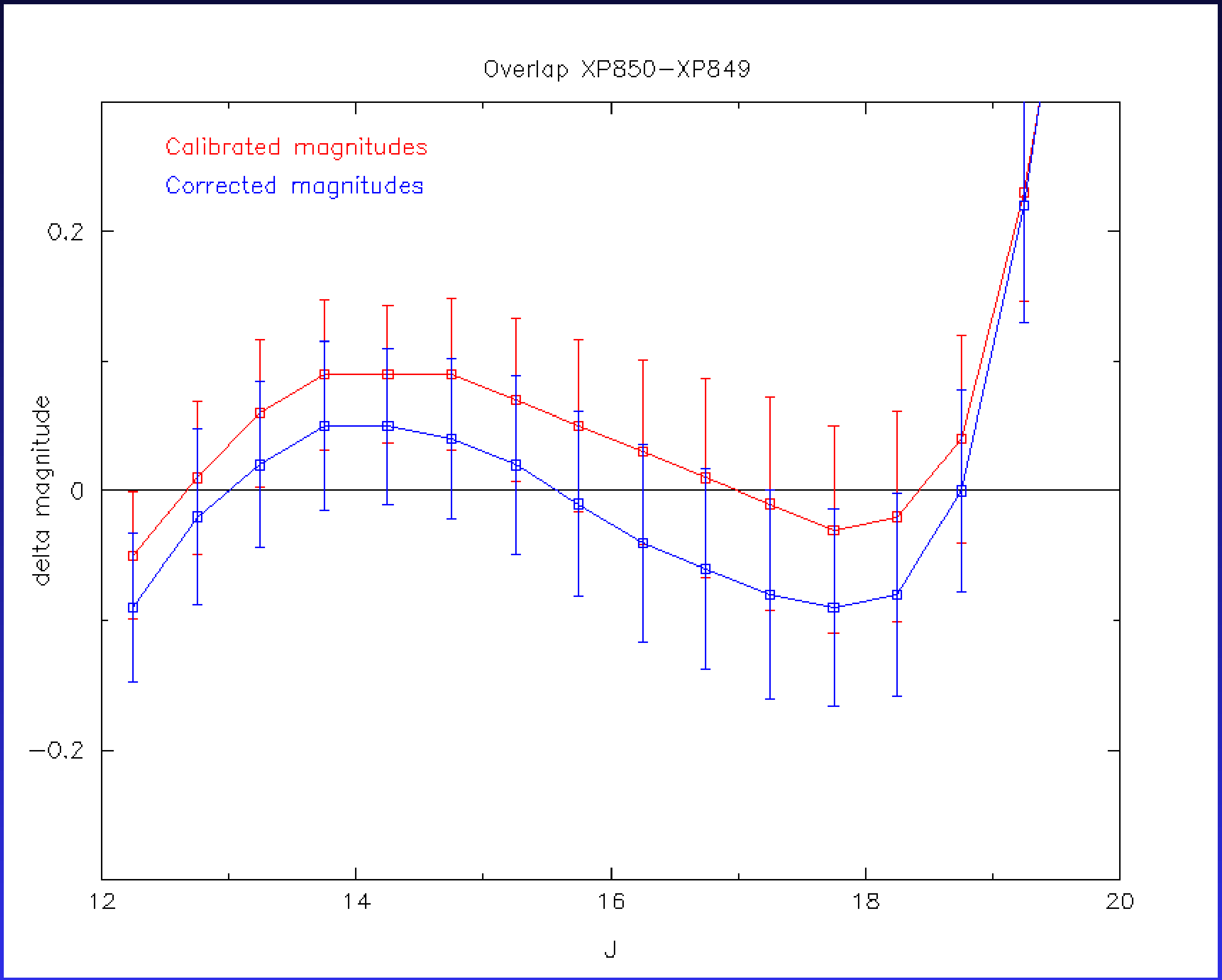

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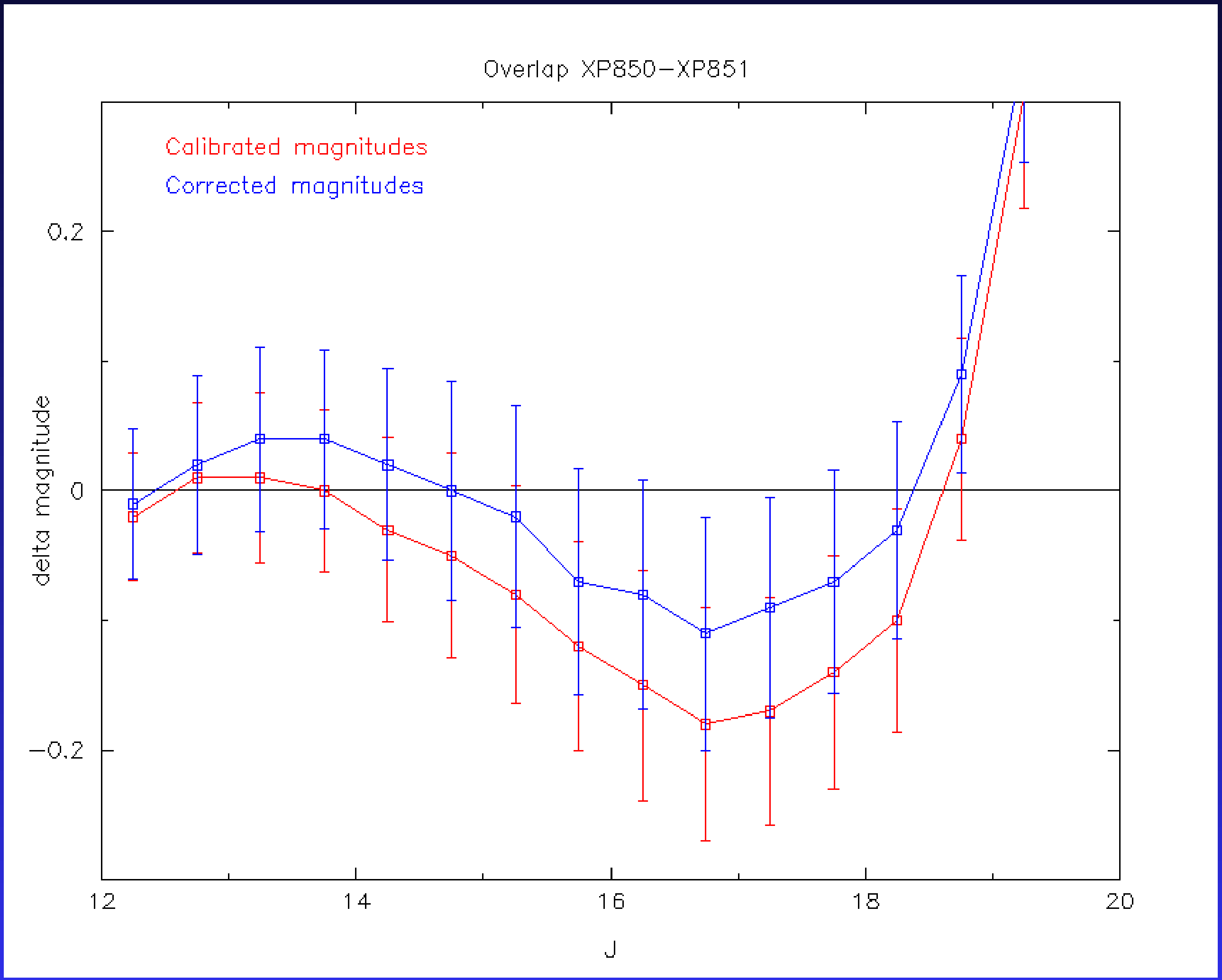

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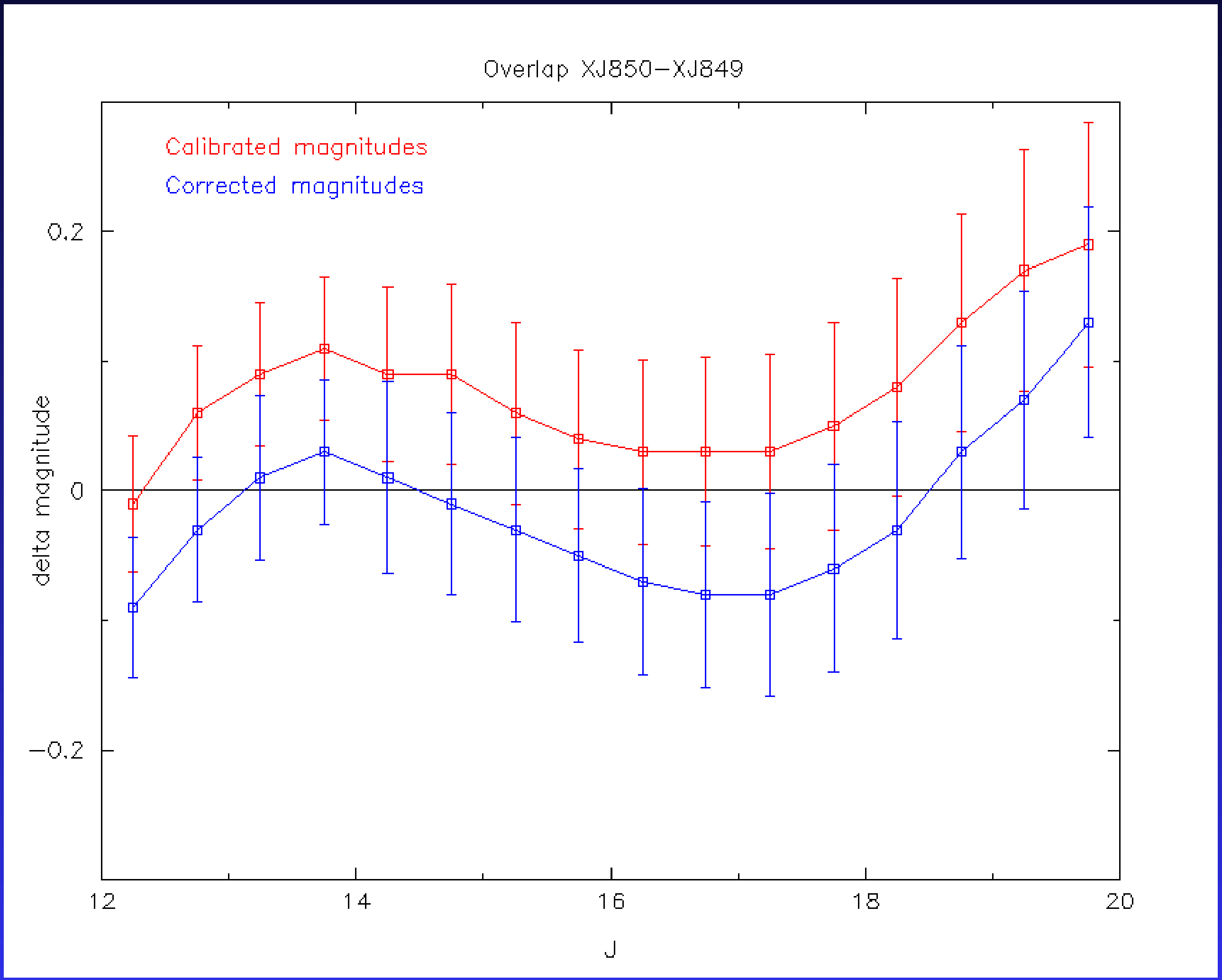

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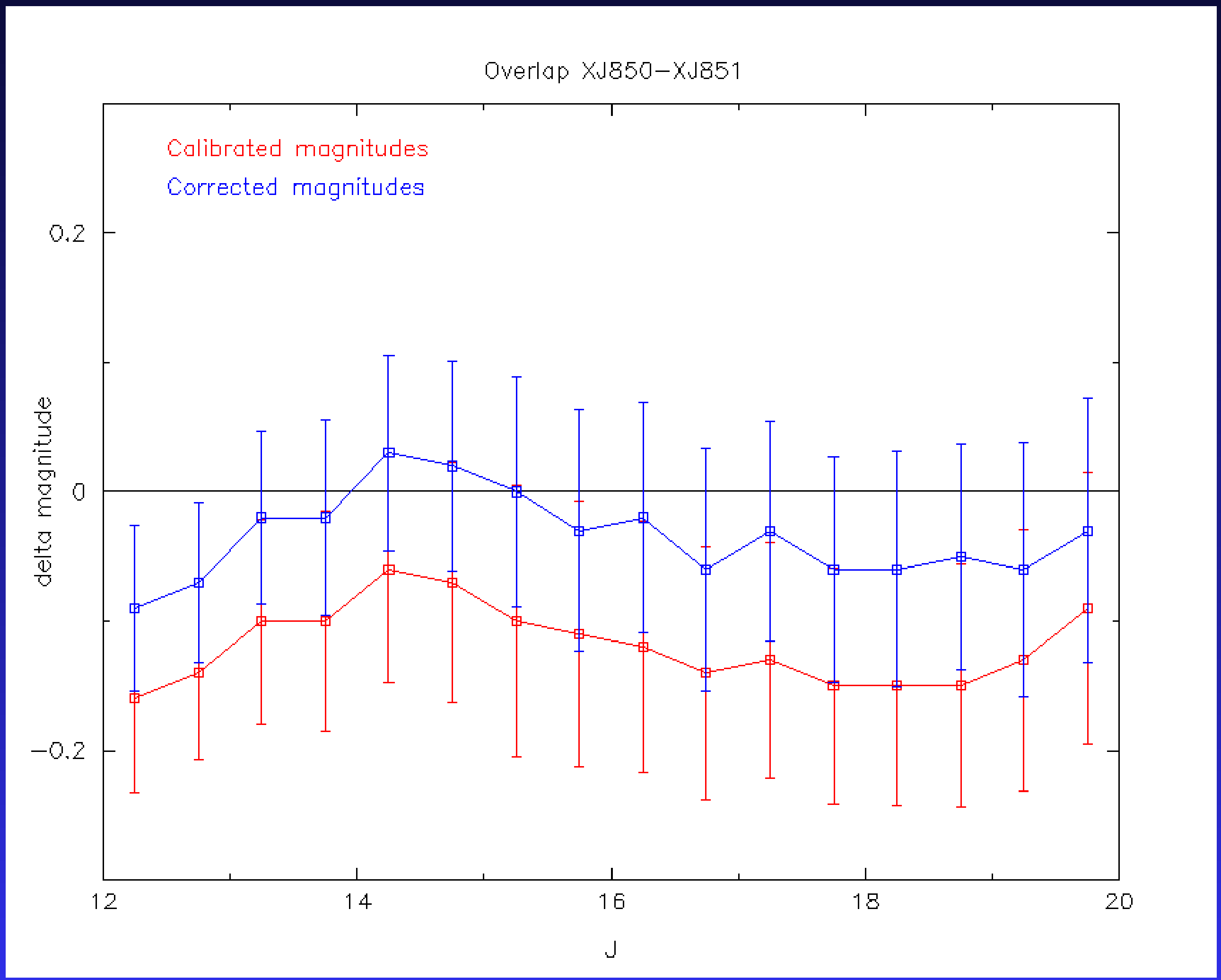

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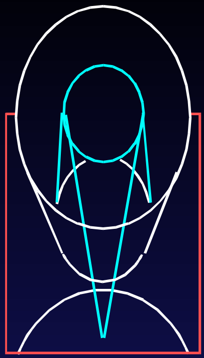

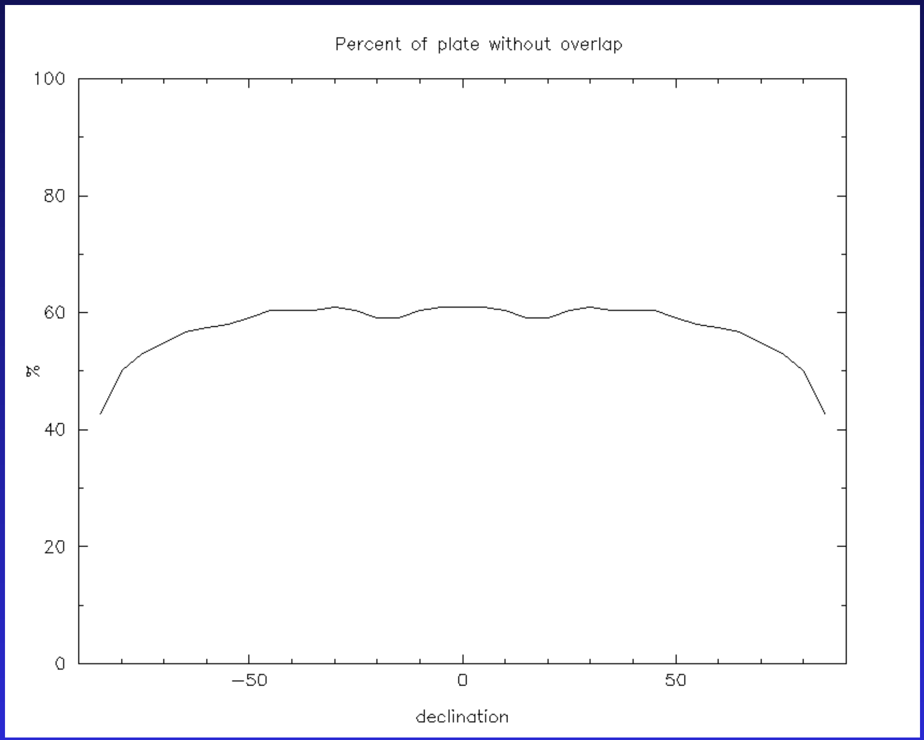

Percentage of the GSC2 data present in an unique plate as a function of declination

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Conclusions and future work

Next GSC2 release should be include magnitudes coming from the center plate only

10 percent of the GSC2 plates are poorly covered by photometric calibrators (3 new GSPC2 runs have been requested for the next semester)

Implement the magnitude correction mask in PHOTOSOL and APPLY_CALIB (NT only)

Apply the correction for the Palomar surveys only (large effect and GSCP2 sequences not in the center plate always)

Large work still pending: the photometric extrapolation algorithm ....