Using a Digital SLR camera to obtain Star Extinction measurements (Continued Studies)

Tristan Sudholz

Introduction

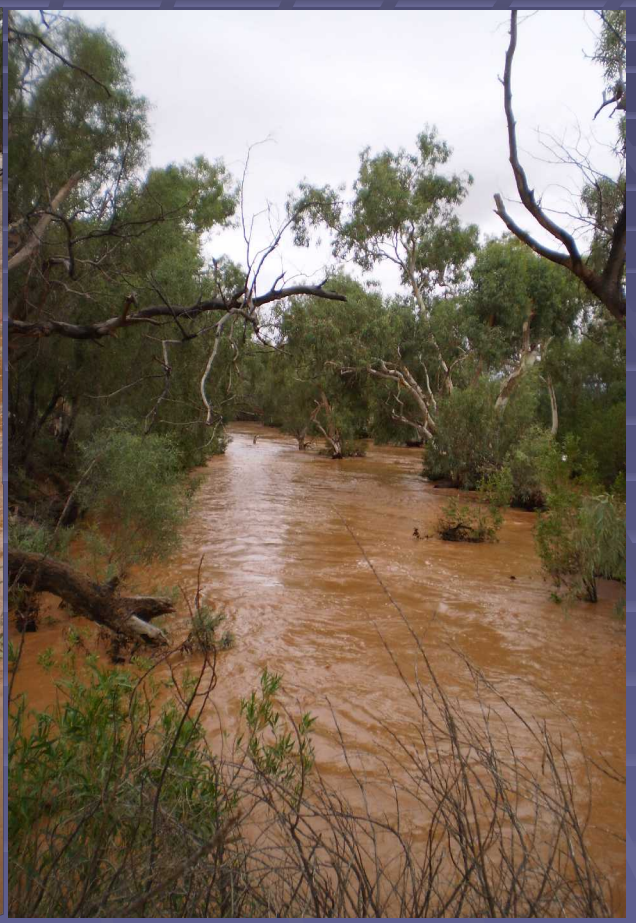
- 2nd Site Survey Trip overview
- Method
- Results
- What's next

2nd Site Survey Trip

- Trip from 9/2 till 16/2
- Non-cloud free days
  - Woomera – 9/2
  - Fowlers Gap – 14/2 & 15/2
- Collected 277 photographs
- It rained and had mini-dust storm at Fowlers Gap

2nd Site Survey Trip





2nd Site Survey Trip

Method

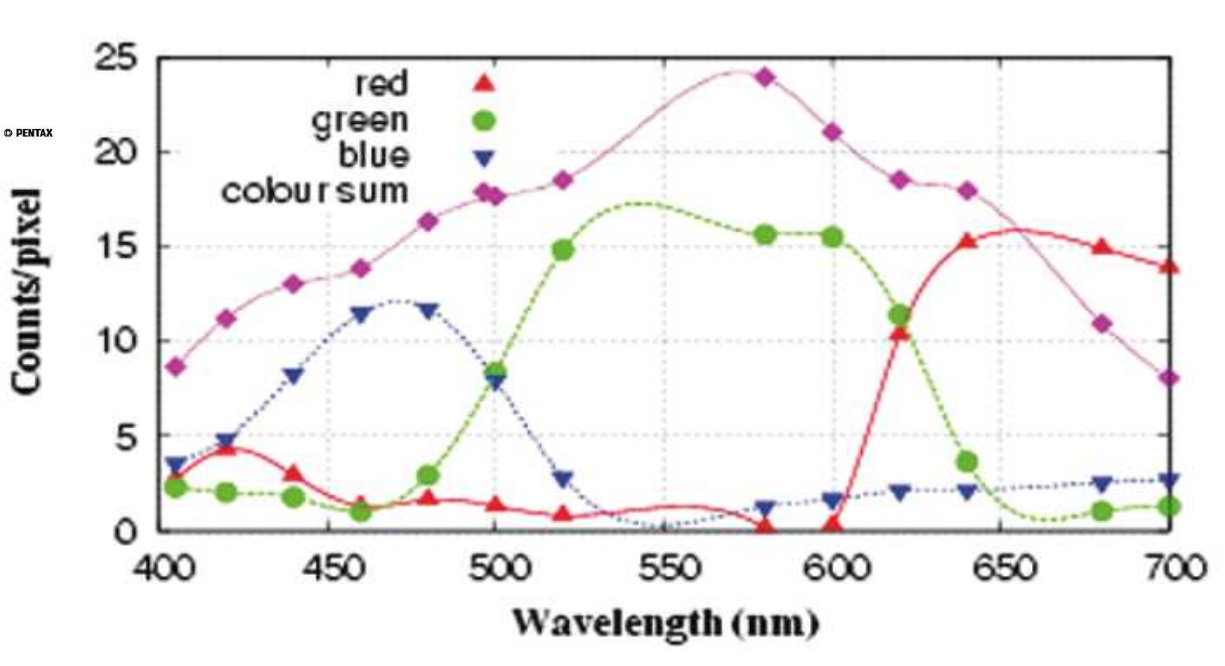
- Using a Pentax K10D digital camera
- Tripod
- 10 Mega-pixels (3819 * 2619 pixels)
- Largest FoV possible is ~60 degrees by ~40 degrees
- Recorded time and date

Method

- Recorded pictures either 10mins or 20min apart for any average of 2hrs
- Followed Achernar and the constellation of Orion as they set (night of 14/2)
- Followed Southern Cross and pointers as they rose (night of 15/2)
- Used different exposure lengths and ISO settings

Method


PENTAX
K10
RAW
SMC PENTAX-DA 1:4(22) 18-40mm ED AL
ø67mm
AF.S
AF.C
MF


© PENTAX
Counts/pixel
Wavelength (nm)
red
green
blue
colour sum
0
5
10
15
20
25
400
450
500
550
600
650
700

Results

- Recorded RAW images
  - Star fields
  - Dark field
  - Flat Field
- Used IRIS v5.58 to process images
- Currently processed 20sec exposed, 400 ISO images of Southern Cross & Pointers on 15/2/2010

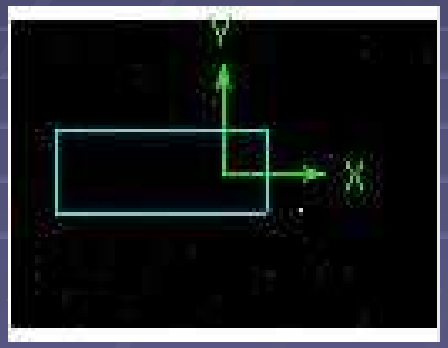
Results

← Picture containing signal and dark noise without flat fielding

Picture with dark field removed →

Results

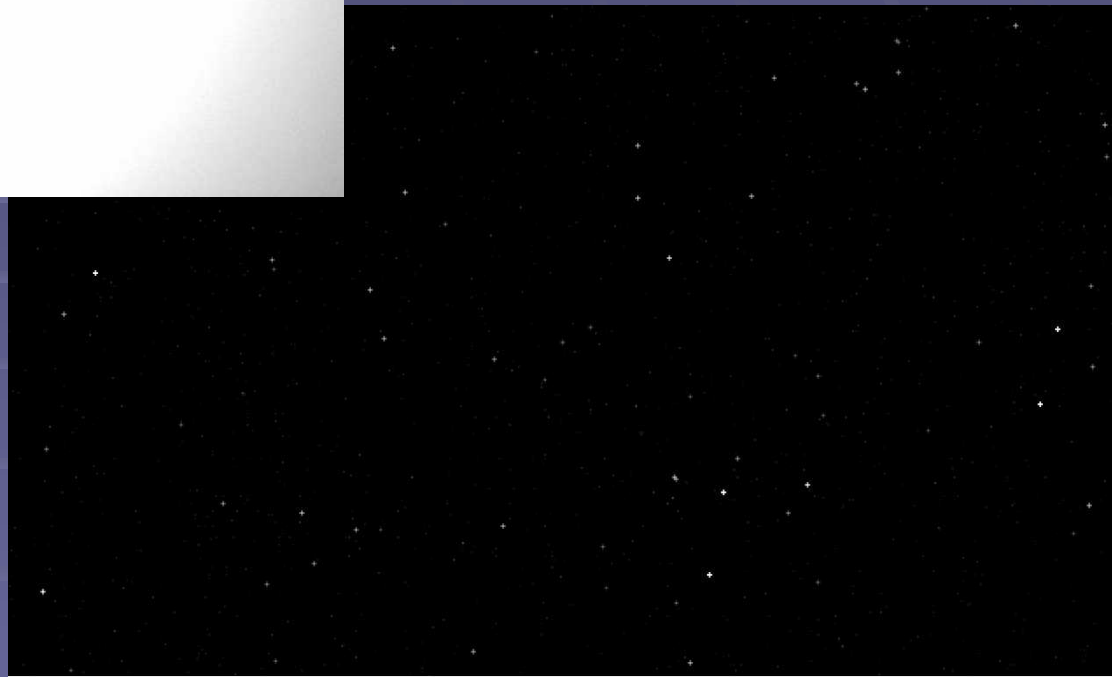
End picture – had dark field and flat field removed



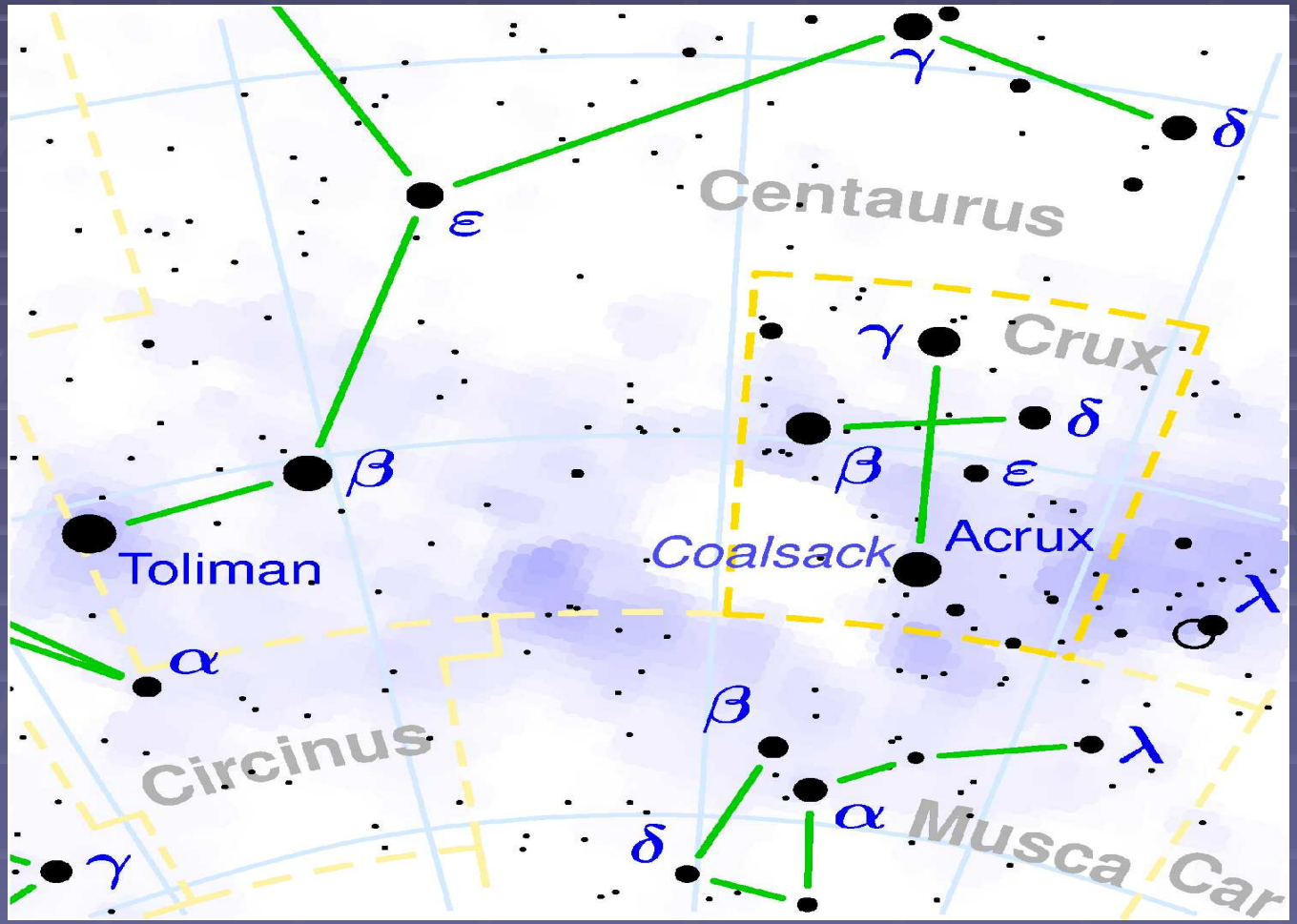
Results

← Flat field picture

Dark field picture →



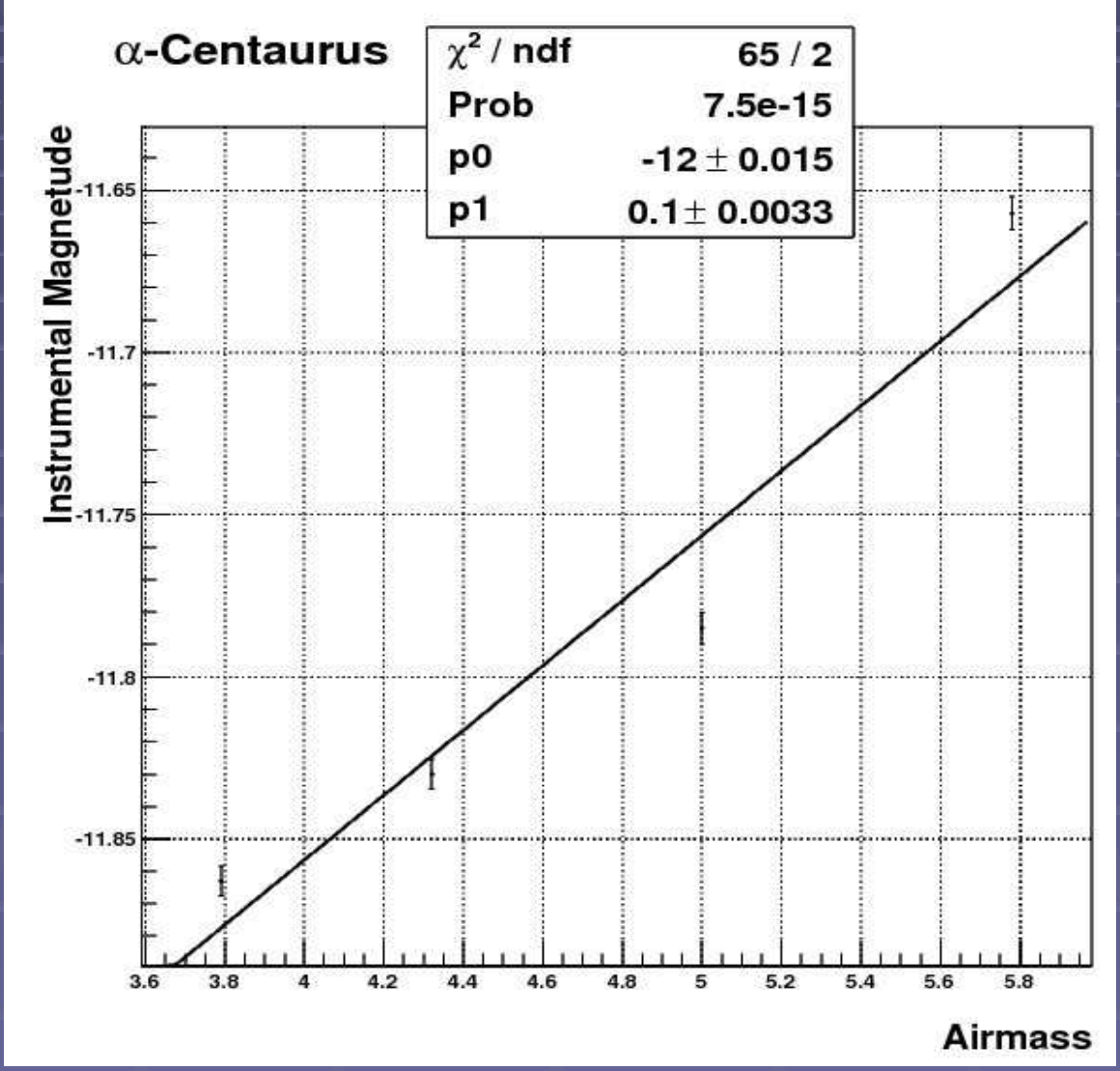
Results


γ
δ
ε
Centaurus
γ
Crux
δ
β
ε
β
Toliman
Coalsack
Acrux
λ
α
β
λ
Circinus
α
Musca
δ
γ
Car

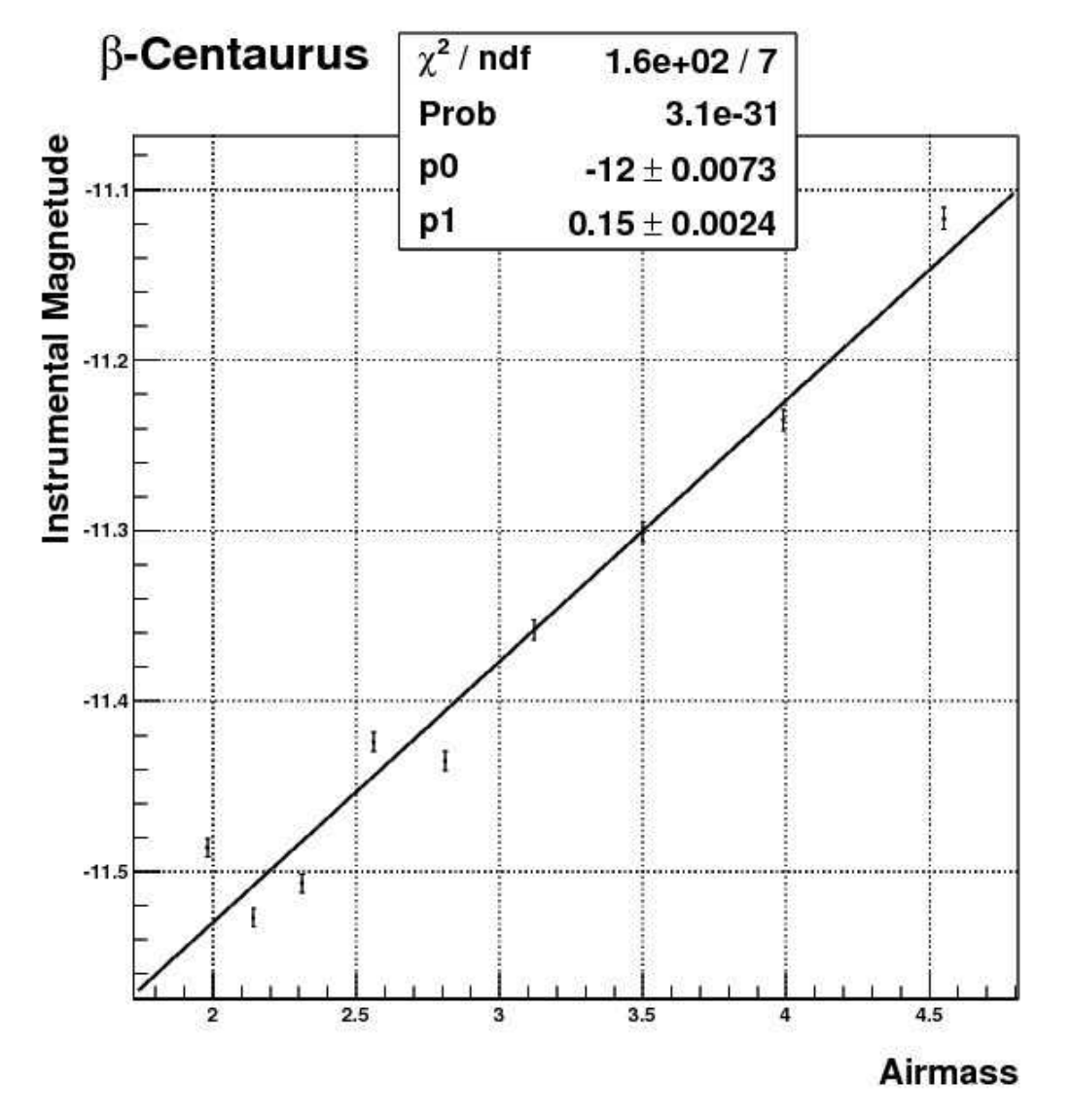
Results

Star	Spectral Type	
α-Cen	G2V	Yellow main-sequence
β-Cen	B1III	Blue Giant
α-Crux	B0.5IV	Blue sub-Giant
β-Crux	B0.5III	Blue GiantIV
γ-Crux	M4III	Red Giant
δ-Crux	B2IV	Blue sub-Giant

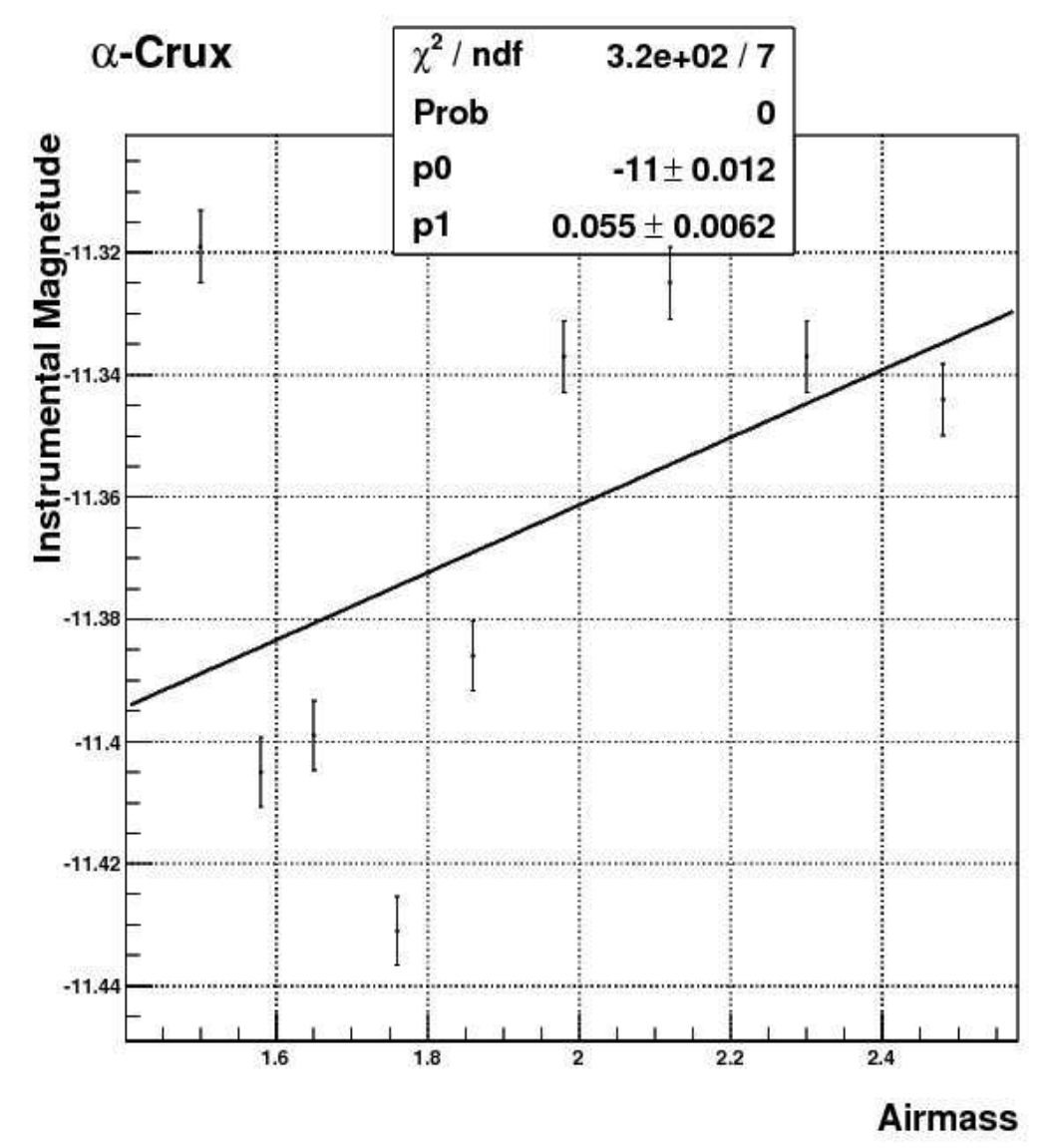
Results


α-Centaurus
χ² / ndf 65 / 2
Prob 7.5e-15
p0 -12 ± 0.015
p1 0.1 ± 0.0033
Instrumental Magnetude
-11.65
-11.7
-11.75
-11.8
-11.85
3.6
3.8
4
4.2
4.4
4.6
4.8
5
5.2
5.4
5.6
5.8
Airmass

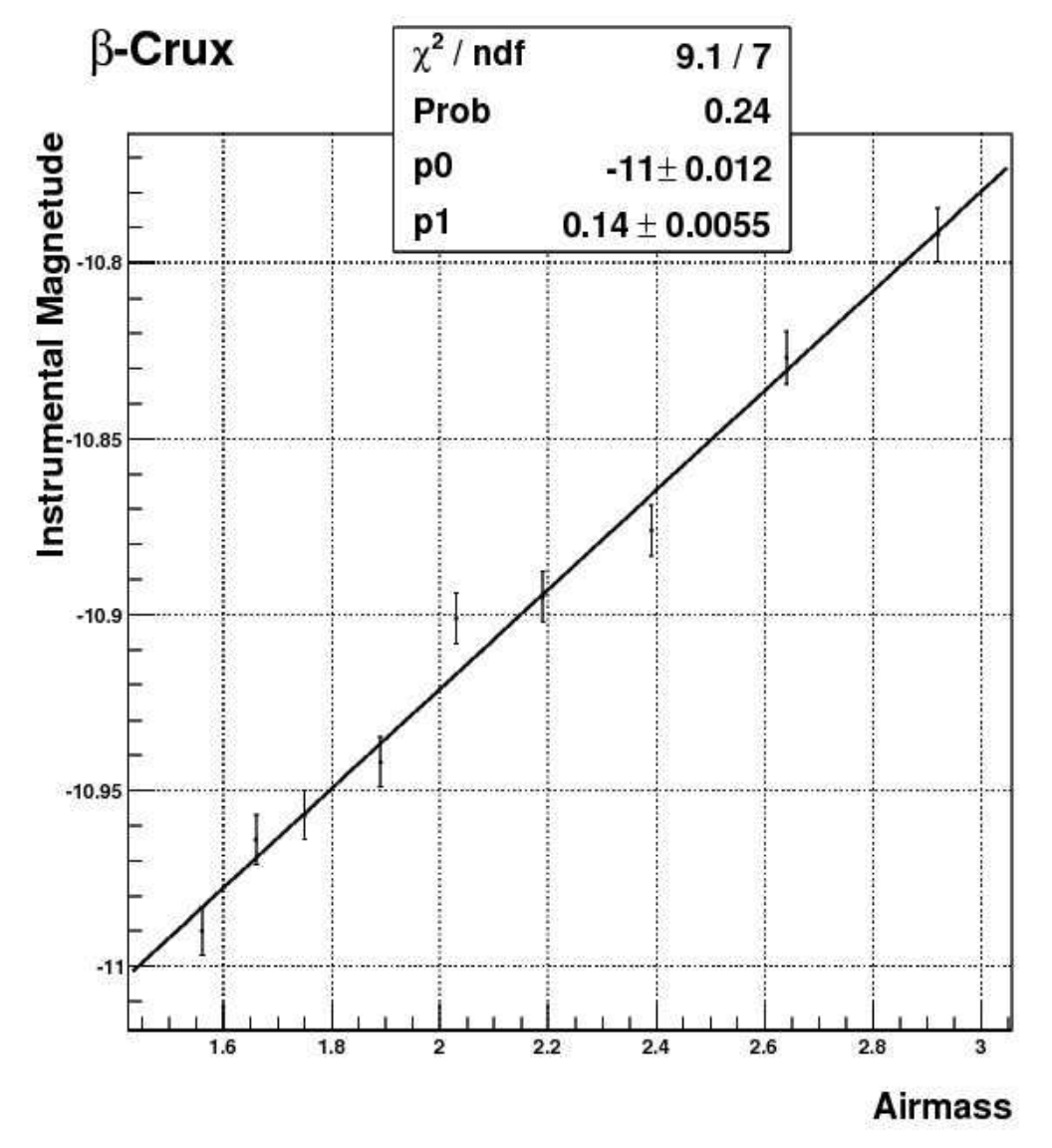
Results


β-Centaurus
χ² / ndf 1.6e+02 / 7
Prob 3.1e-31
p0 -12 ± 0.0073
p1 0.15 ± 0.0024
Instrumental Magnetude
-11.1
-11.2
-11.3
-11.4
-11.5
2
2.5
3
3.5
4
4.5
Airmass

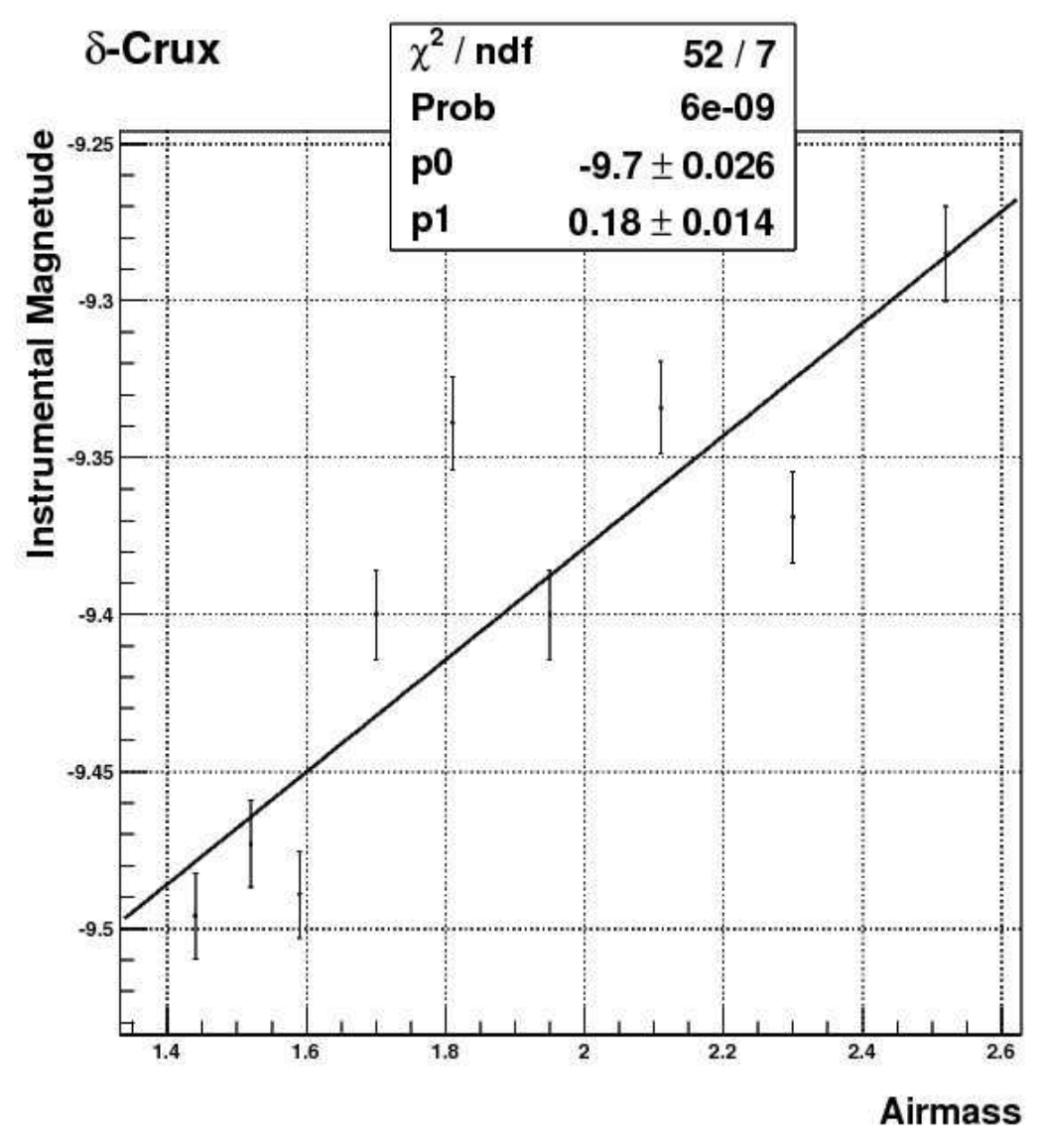
Results


α-Crux
χ² / ndf 3.2e+02 / 7
Prob 0
p0 -11 ± 0.012
p1 0.055 ± 0.0062
Instrumental Magnetude
-11.32
-11.34
-11.36
-11.38
-11.4
-11.42
-11.44
1.6
1.8
2
2.2
2.4
Airmass

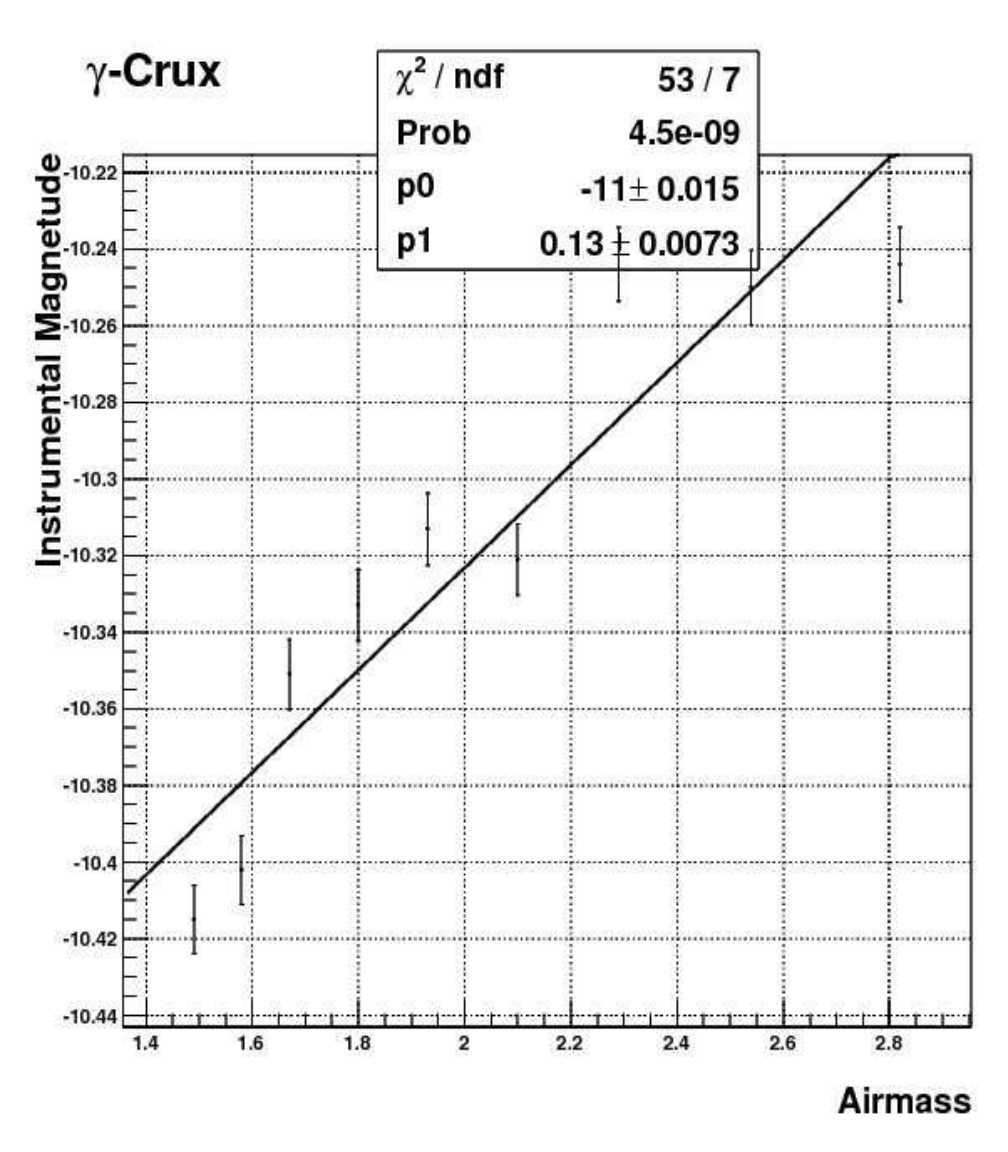
Results


β-Crux
χ² / ndf 9.1 / 7
Prob 0.24
p0 -11 ± 0.012
p1 0.14 ± 0.0055
Instrumental Magnetude
-10.8
-10.85
-10.9
-10.95
-11
1.6
1.8
2
2.2
2.4
2.6
2.8
3
Airmass

Results


δ-Crux
χ² / ndf 52 / 7
Prob 6e-09
p0 -9.7 ± 0.026
p1 0.18 ± 0.014
Instrumental Magnetude
-9.25
-9.3
-9.35
-9.4
-9.45
-9.5
1.4
1.6
1.8
2
2.2
2.4
2.6
Airmass

Results


γ-Crux
χ² / ndf 53 / 7
Prob 4.5e-09
p0 -11 ± 0.015
p1 0.13 ± 0.0073
Instrumental Magnetude
-10.22
-10.24
-10.26
-10.28
-10.3
-10.32
-10.34
-10.36
-10.38
-10.4
-10.42
-10.44
1.4
1.6
1.8
2
2.2
2.4
2.6
2.8
Airmass

What's next?

- Extend error analysis
- Repeat above analysis on photos taken same night and on different nights
- Use an averaged dark and flat field