Wavelength dependence in the flux ratio of the double quasar SDSS J1650+4251

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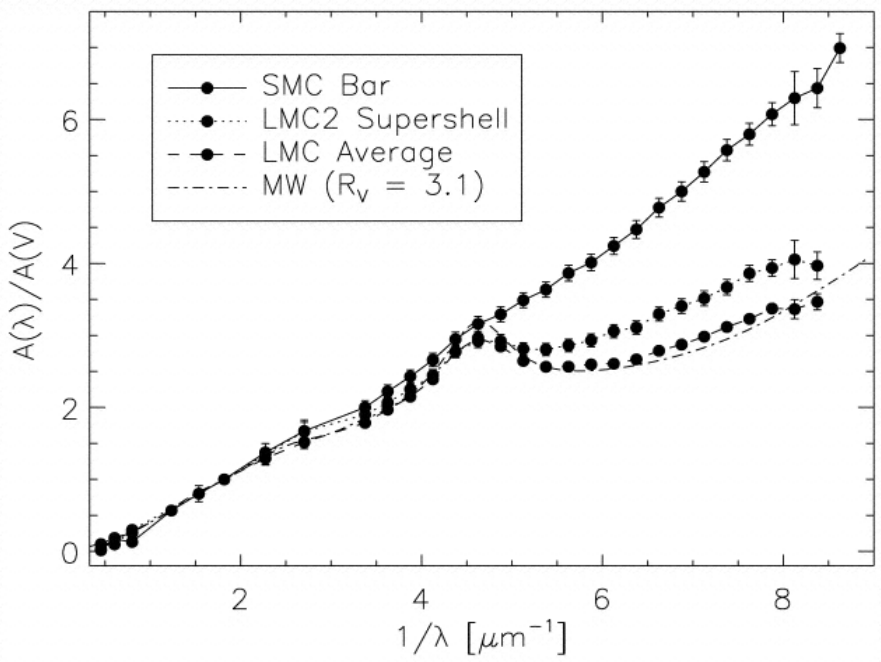
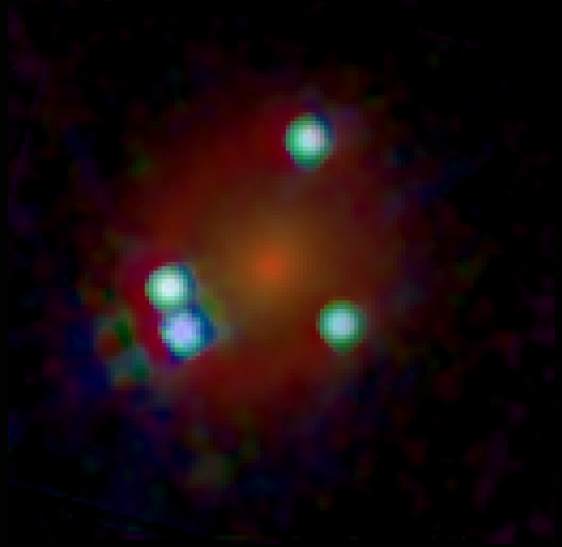
Average extinction curves (MW, SMC, LMC)

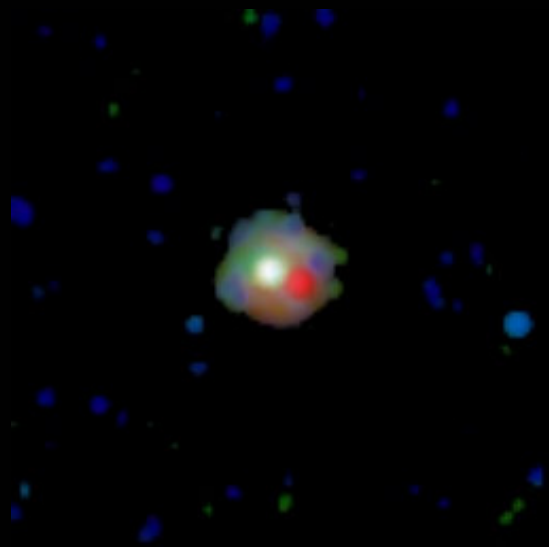
- Sample average extinction curves plotted along with the "average" Milky Way curve (CCM with Rv=3.1) (Gordon et al. 2003)
- The 2175 Å bump is absent in the SMC bar sight lines while in other mesured extinction curves it is prominent.
- Gravitationally lensed QSOs can be used to determine the extinction law in galaxies where individual stars cannot be resolved.



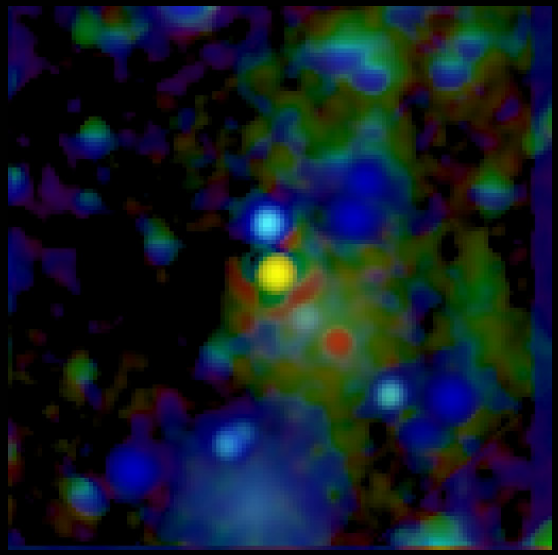
Extinction in high redshift galaxies



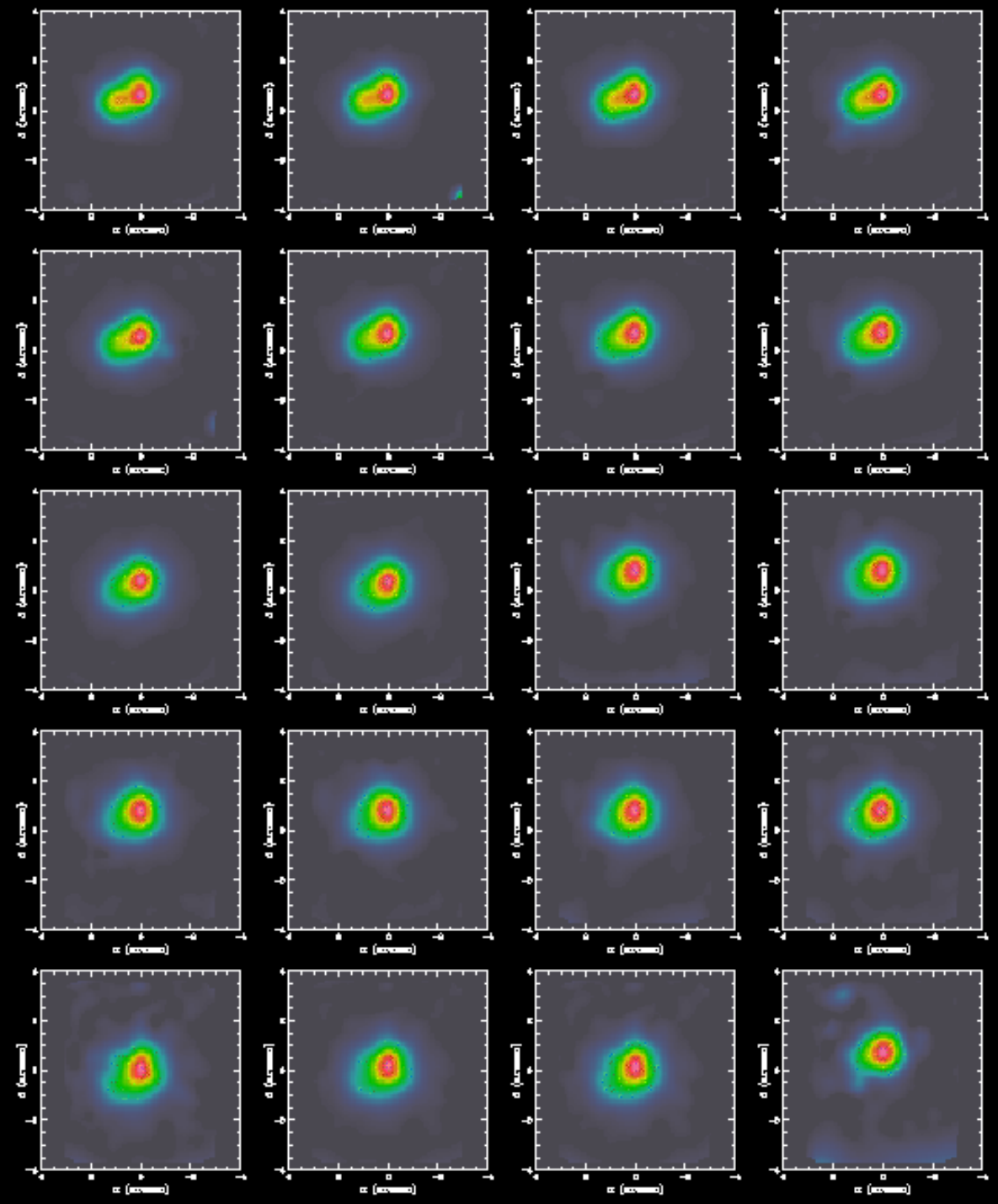
$Z_{lens} = 0.31$
$Z_{source} = 1.72$

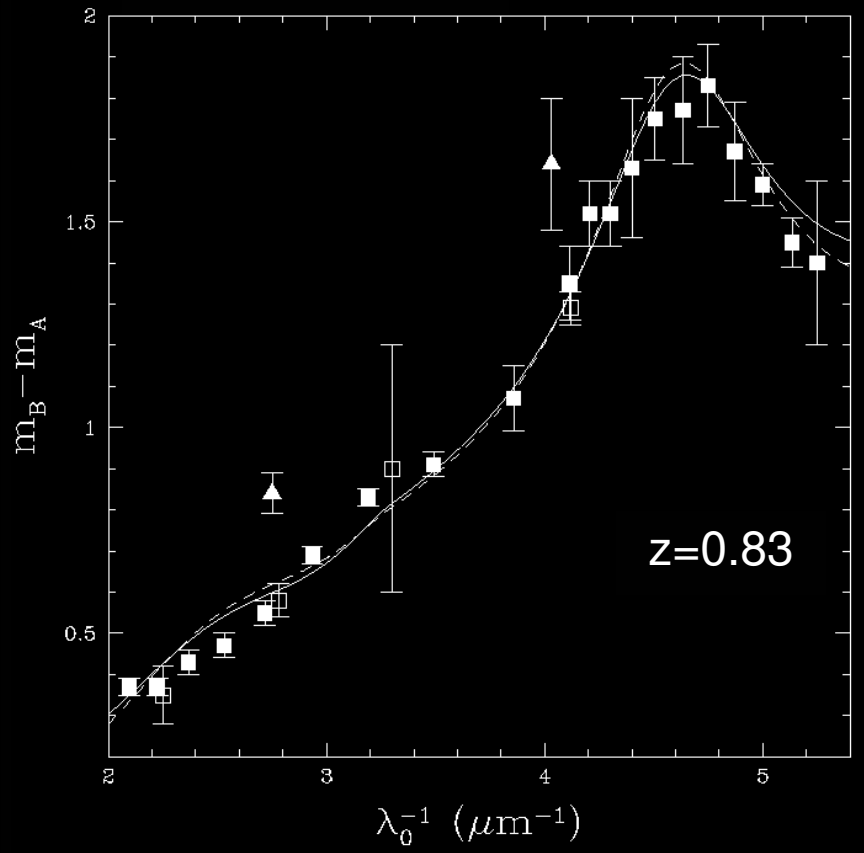


$Z_{lens} = 0.68$
$Z_{source} = 0.96$



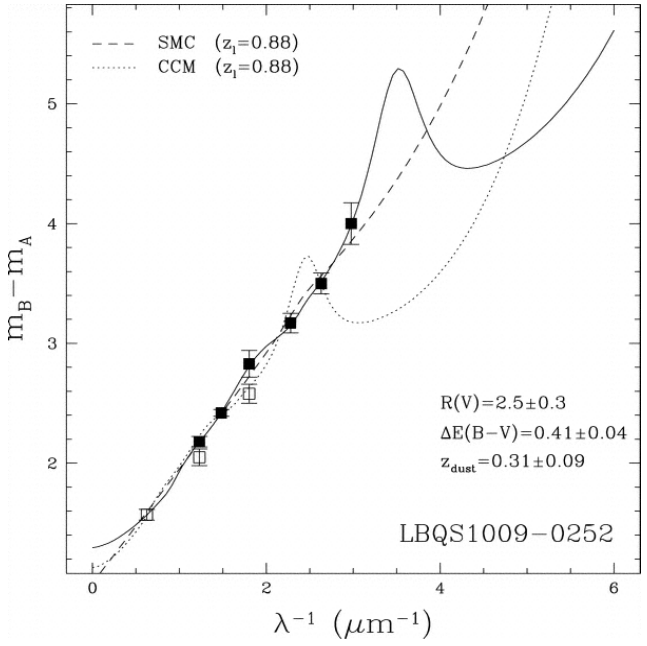
$Z_{lens} = 0.89$
$Z_{source} = 2.51$

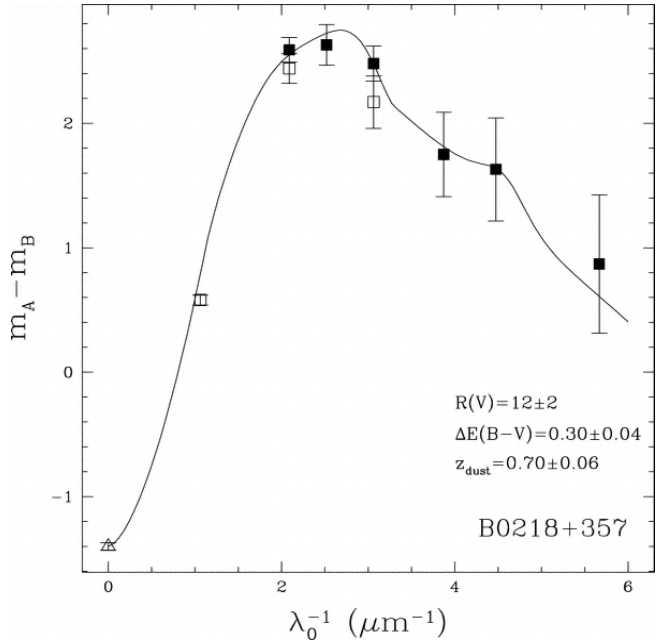




Motta, Mediavilla, Muñoz et al. ApJ 2002

Muñoz et al. 2004, ApJ





A Survey of Extinction Curves to Redshift z=1.

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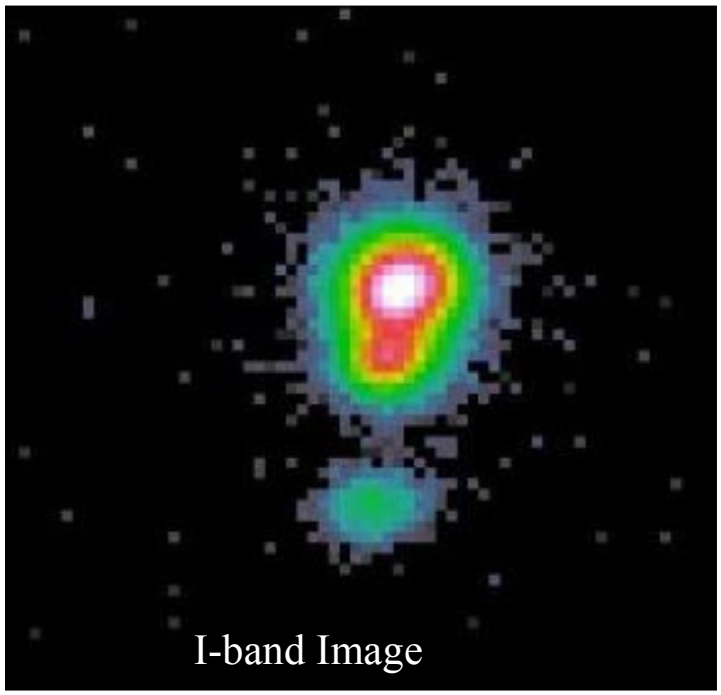
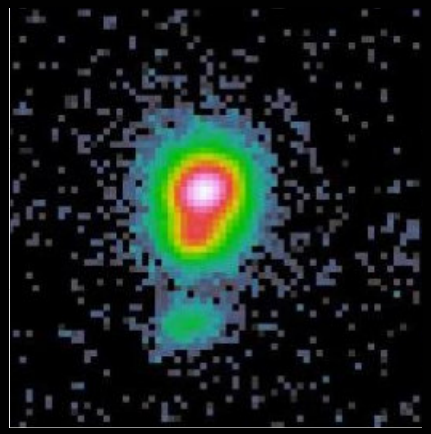
Observations and analysis

- Object of study: double quasar SDSS J1650 + 4251, with z = 1.547 (Morgan, Snyder, Reens 2003)
- Observations: NOT (2.56 m)
- Wavelength interval: 3510-8130 Å
- Performed PSF photometry fitting
- Derive the extinction law of the lens galaxy
- Discuss the 2175 Å feature

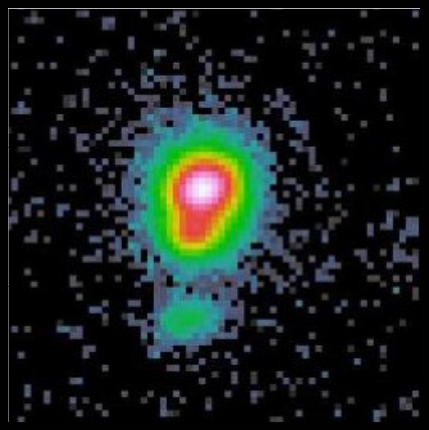


I-band Image

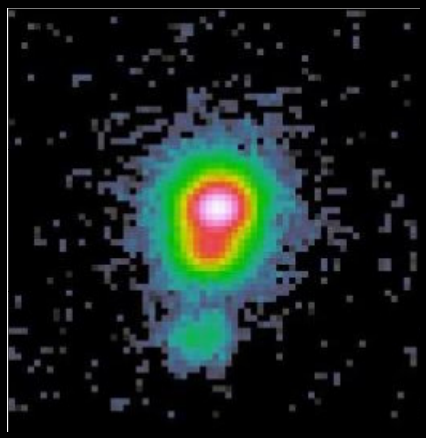
SDSS J1650+4251 images in 8 different filters



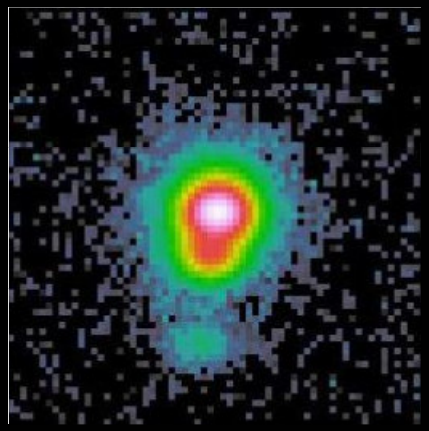
I- band (λ = 8130Å)



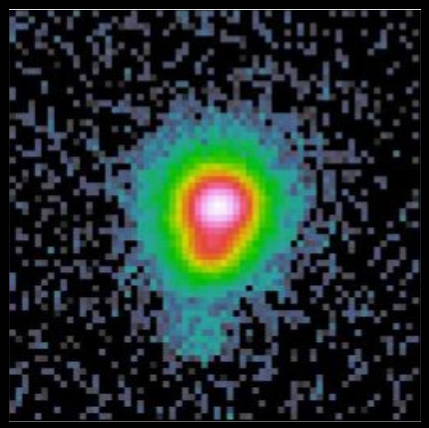
Iac#29 (λ = 7015Å)



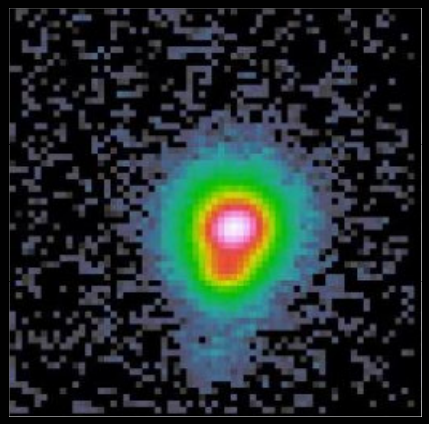
Hα (λ = 6567Å)



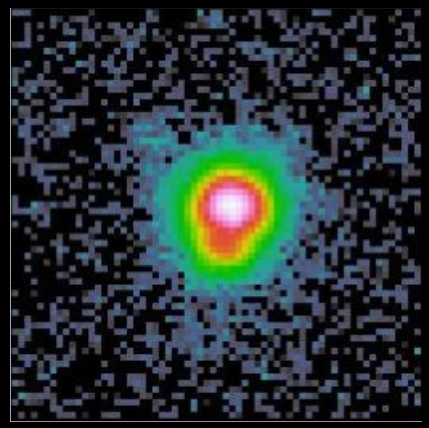
Iac#28 (λ = 6062Å)



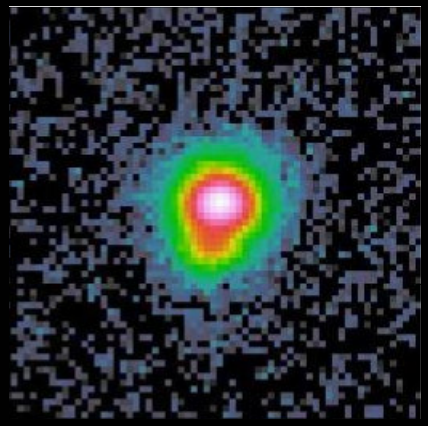
Strömgren y (λ = 5470Å)



Strömgren b (λ = 4670Å)

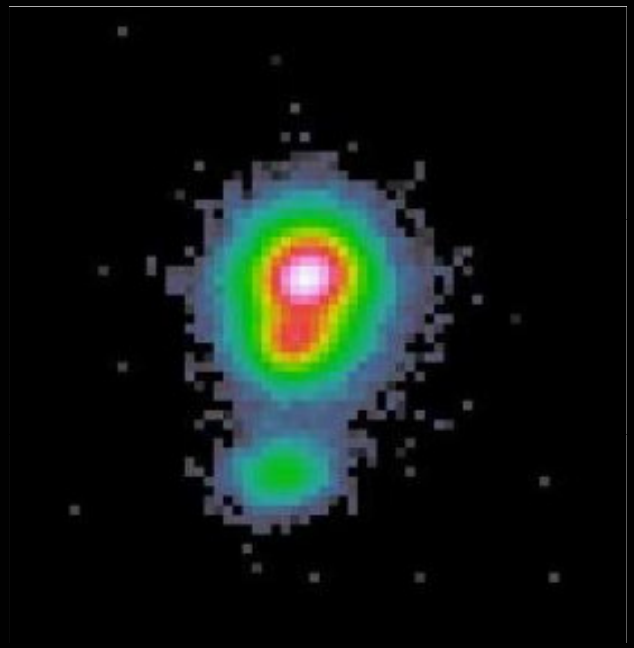


Strömgren v (λ = 4110Å)

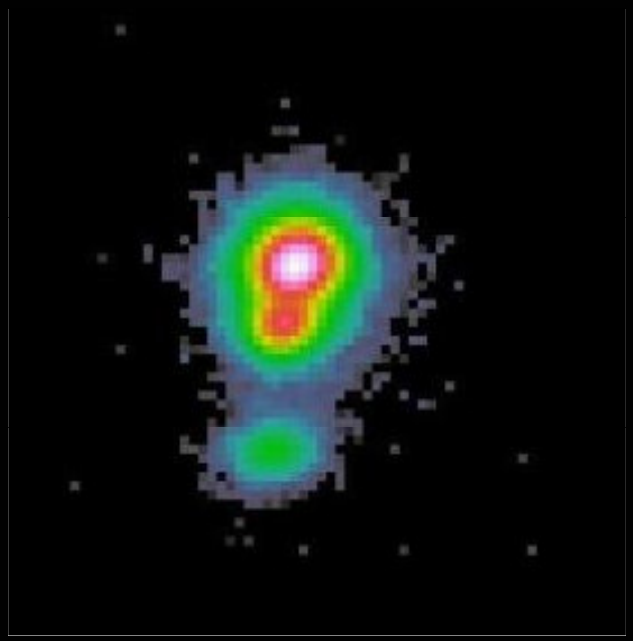


Strömgren u (λ = 3510Å)

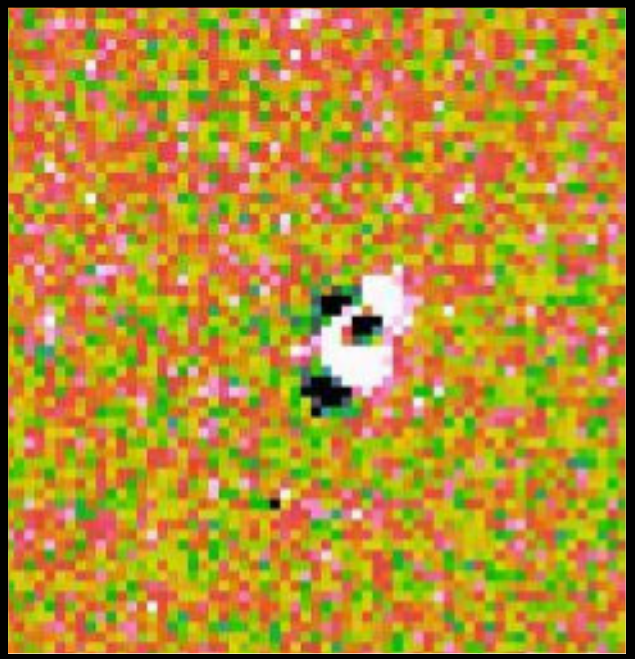
I-band image (λ= 8130Å)



SDSS J1650+4251

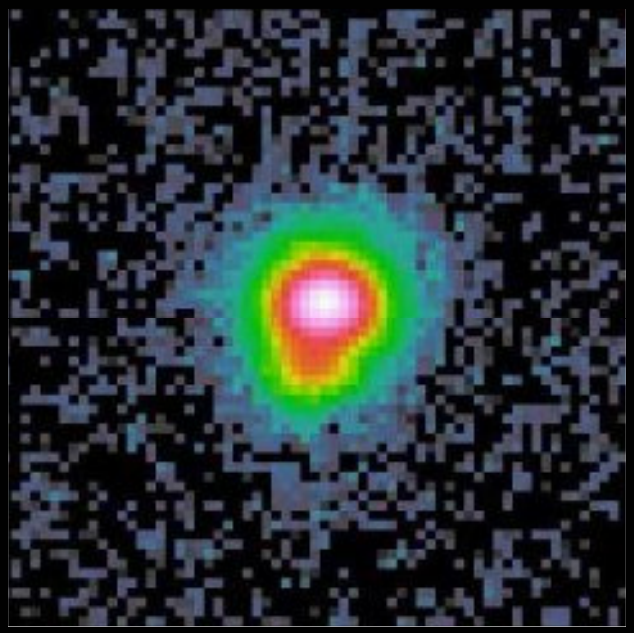


Modelled image without LG

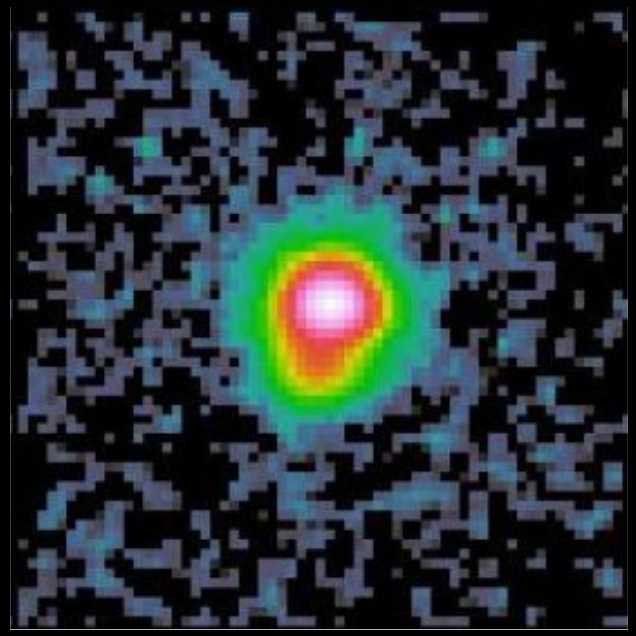


Residuals

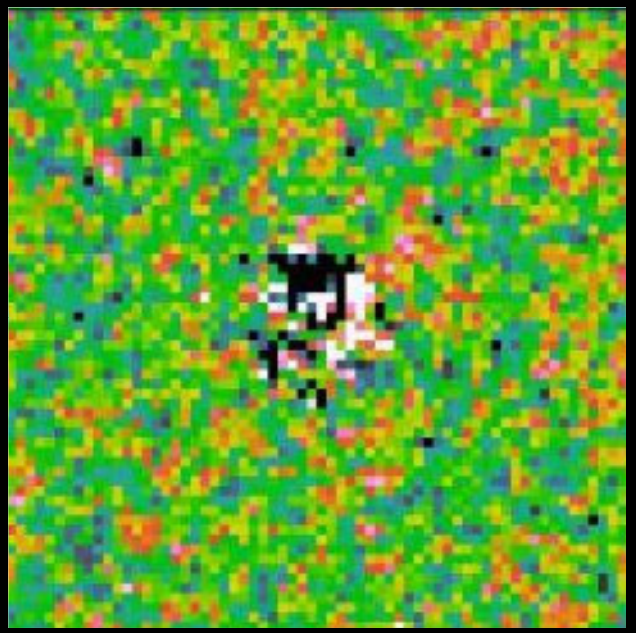
Strömgren-u (λ= 3510Å)



SDSS J1650+4251

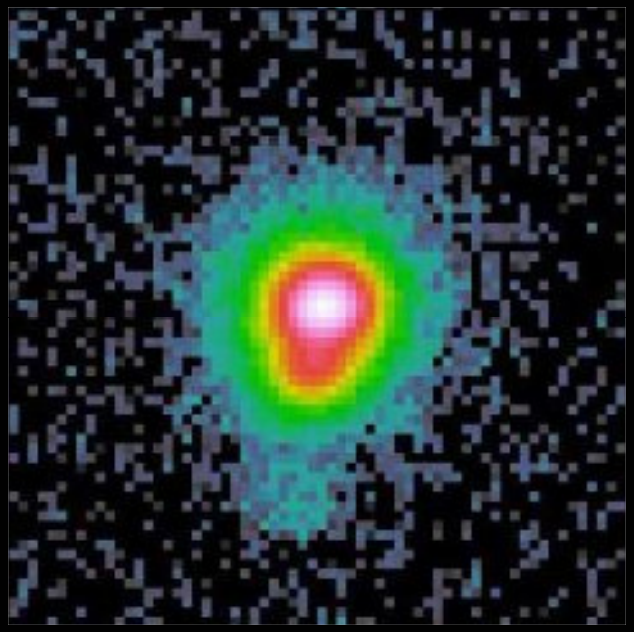


Modelled image

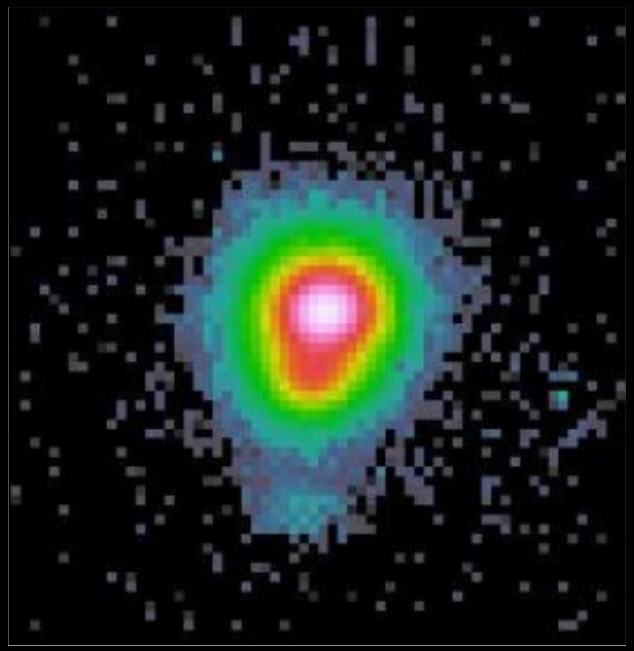


Residuals

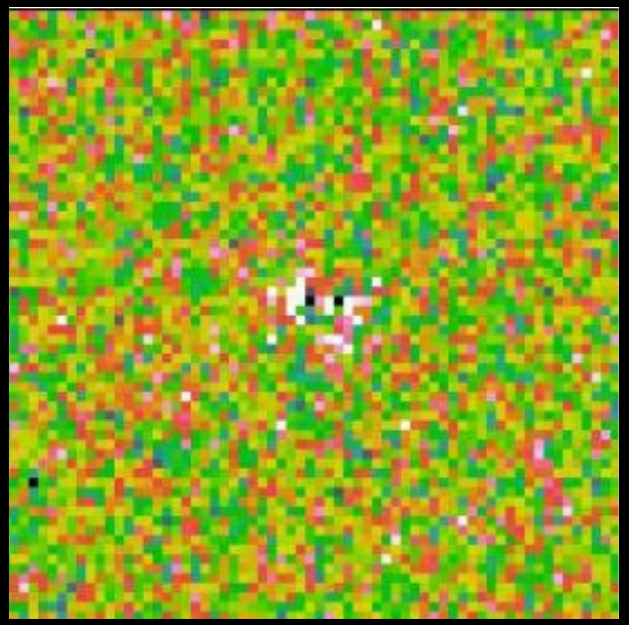
Strömgren-y (λ= 5470Å)



SDSS J1650+4251

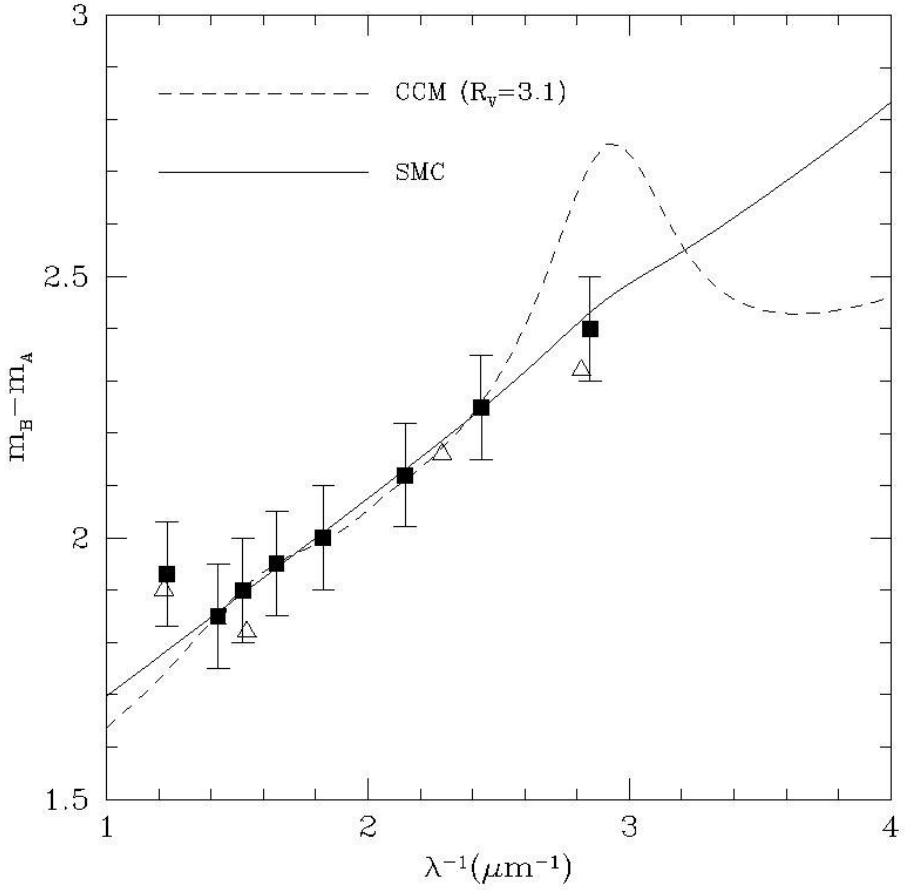


Modelled image



Residuals

SDSS J1650 + 4251 extinction curve



Conclusions

- The existence of the lens galaxy has been well determined in the I-band image.
- Our results are in agreement with those obtained by Morgan, Snyder, & Reens (2003)
- We have estimated de extinction law of the galaxy
- The absence of the 2175 Å feature is clearly confirmed with the strömgren-u data.
- We have found a galaxy which extinction law behaviour is similar to the SMC