Rapid-response spectrophotometric characterization of Near-Earth Objects

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UNAM/NAU

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Introduction

Why are NEOs important?

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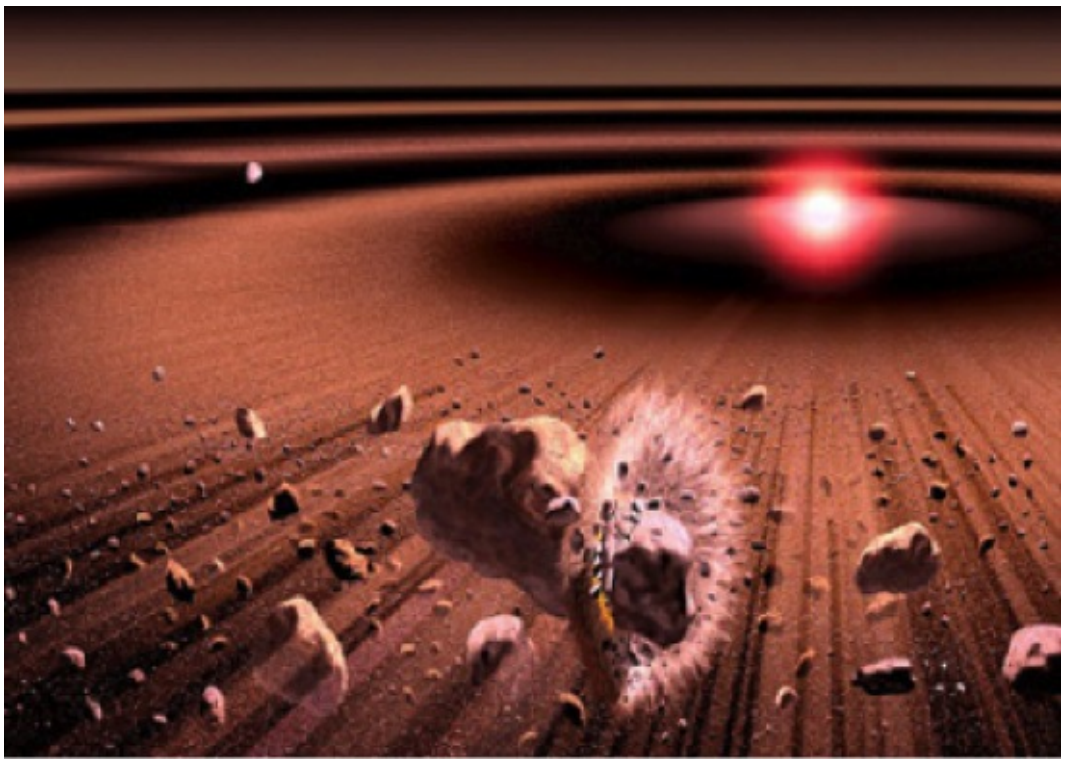
Why are NEOs important?

- **Origins of the Solar System**



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Why are NEOs important?

- Origins of the Solar System
- **Earth's safety**

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Why are NEOs important?

- Origins of the Solar System
- Earth's safety
- **Mineral resources**

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(Trilling et al, 2017).

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  - orbits
  - compositions

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  - orbits
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- **Small asteroids (D$<$100m)**
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  - compositions

- **Small asteroids**
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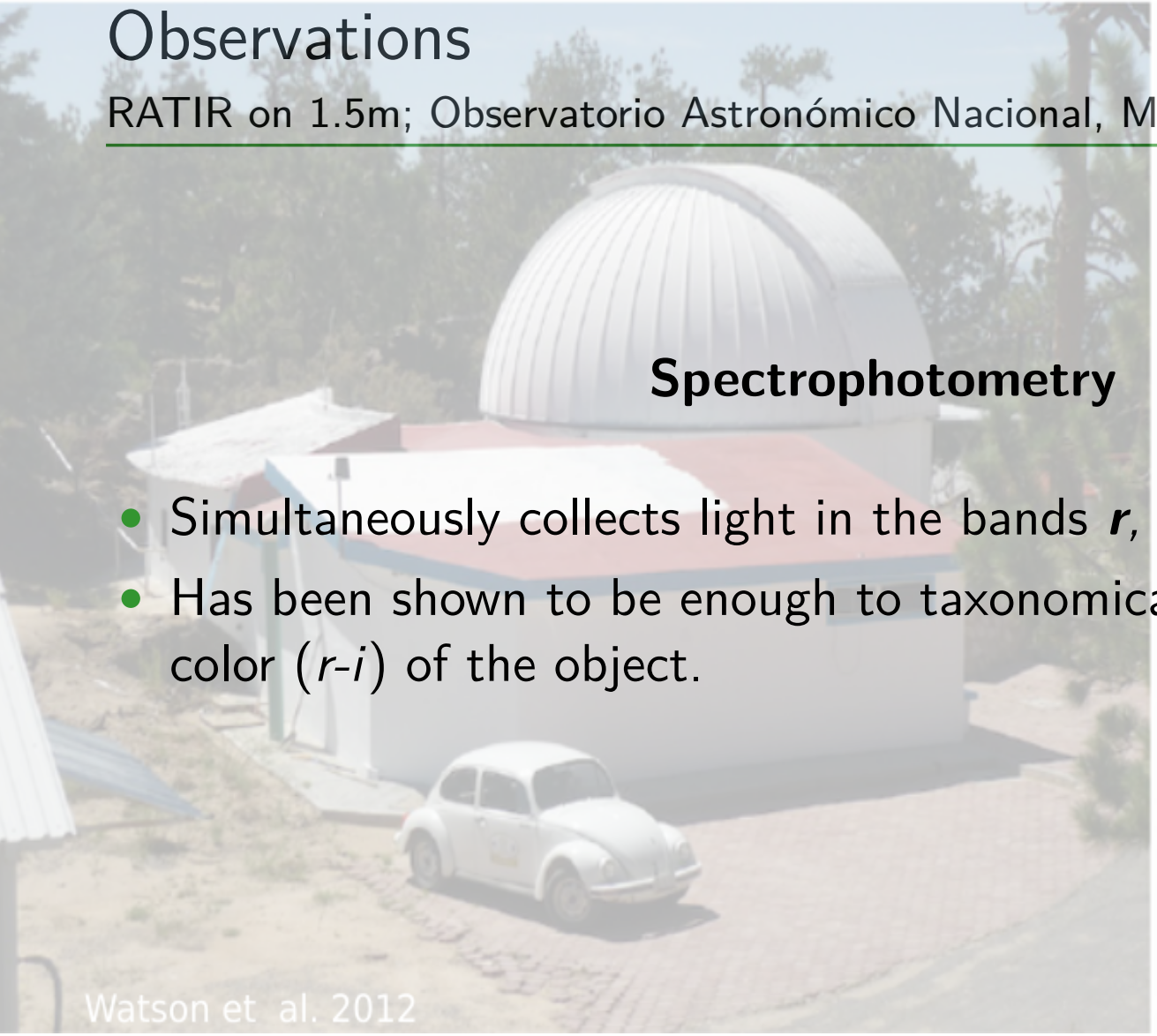

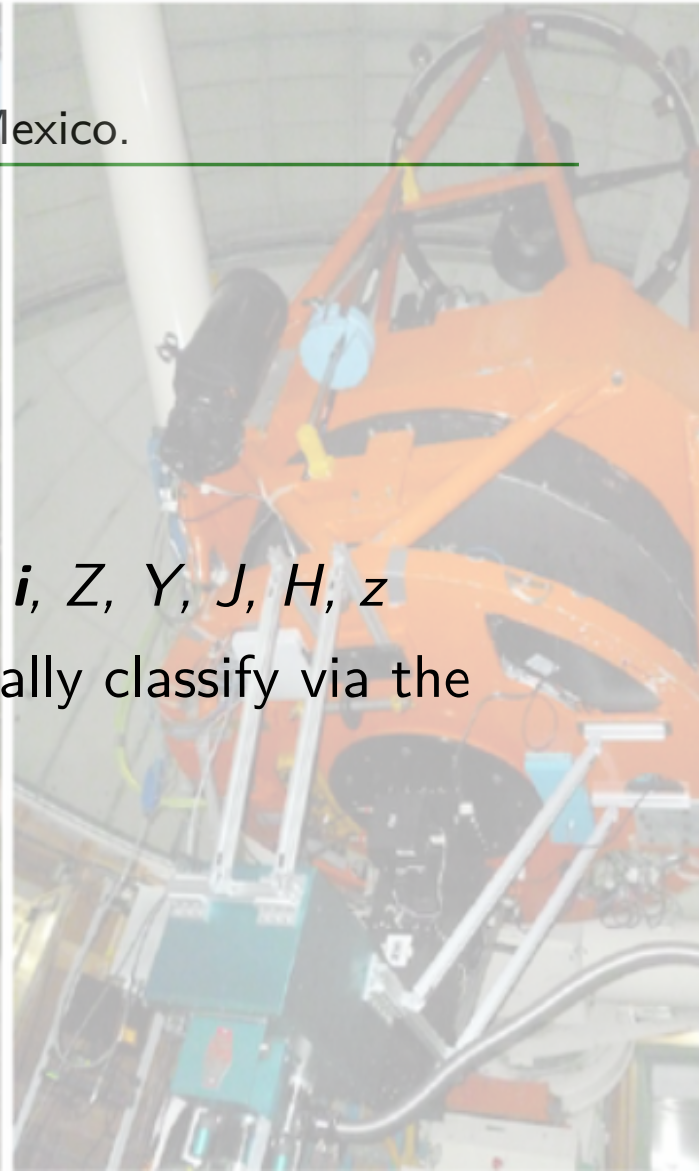

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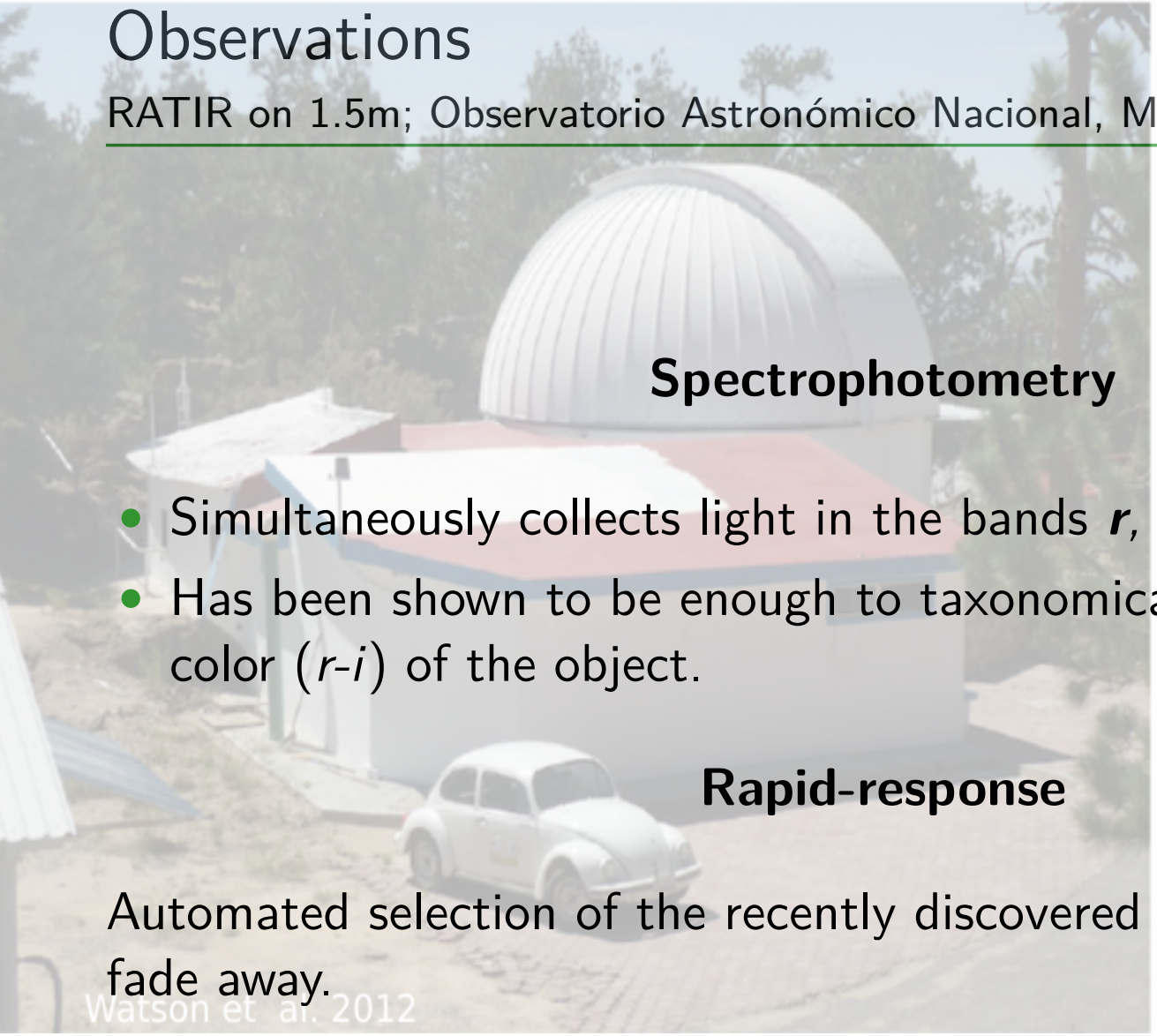

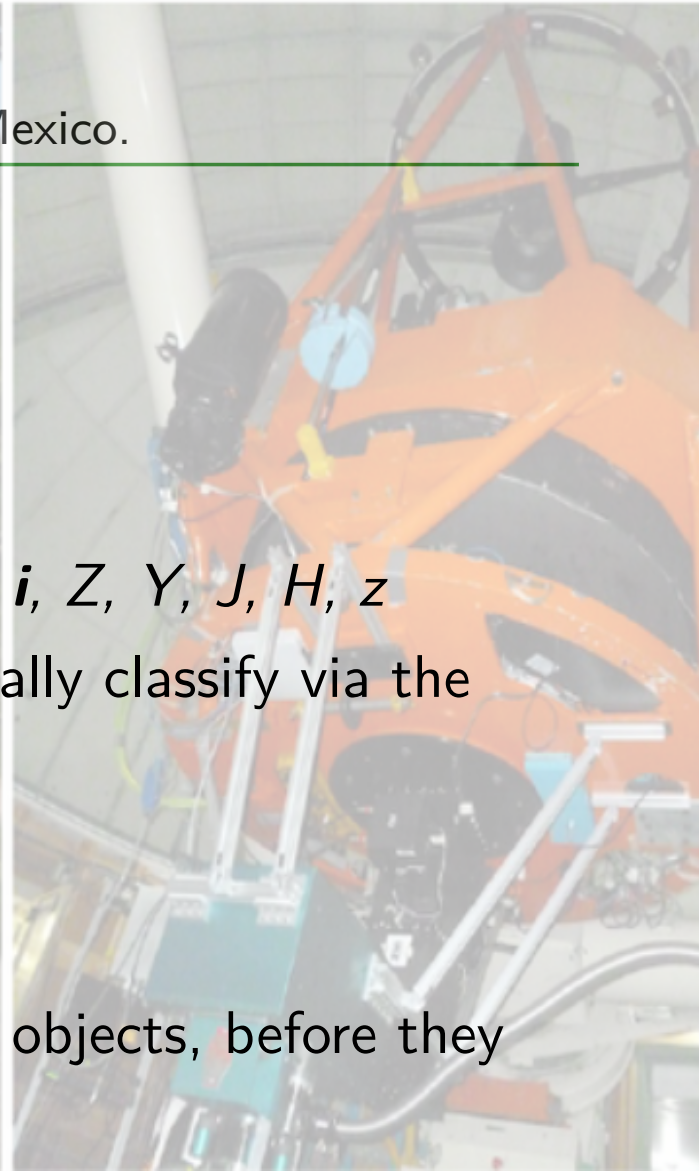

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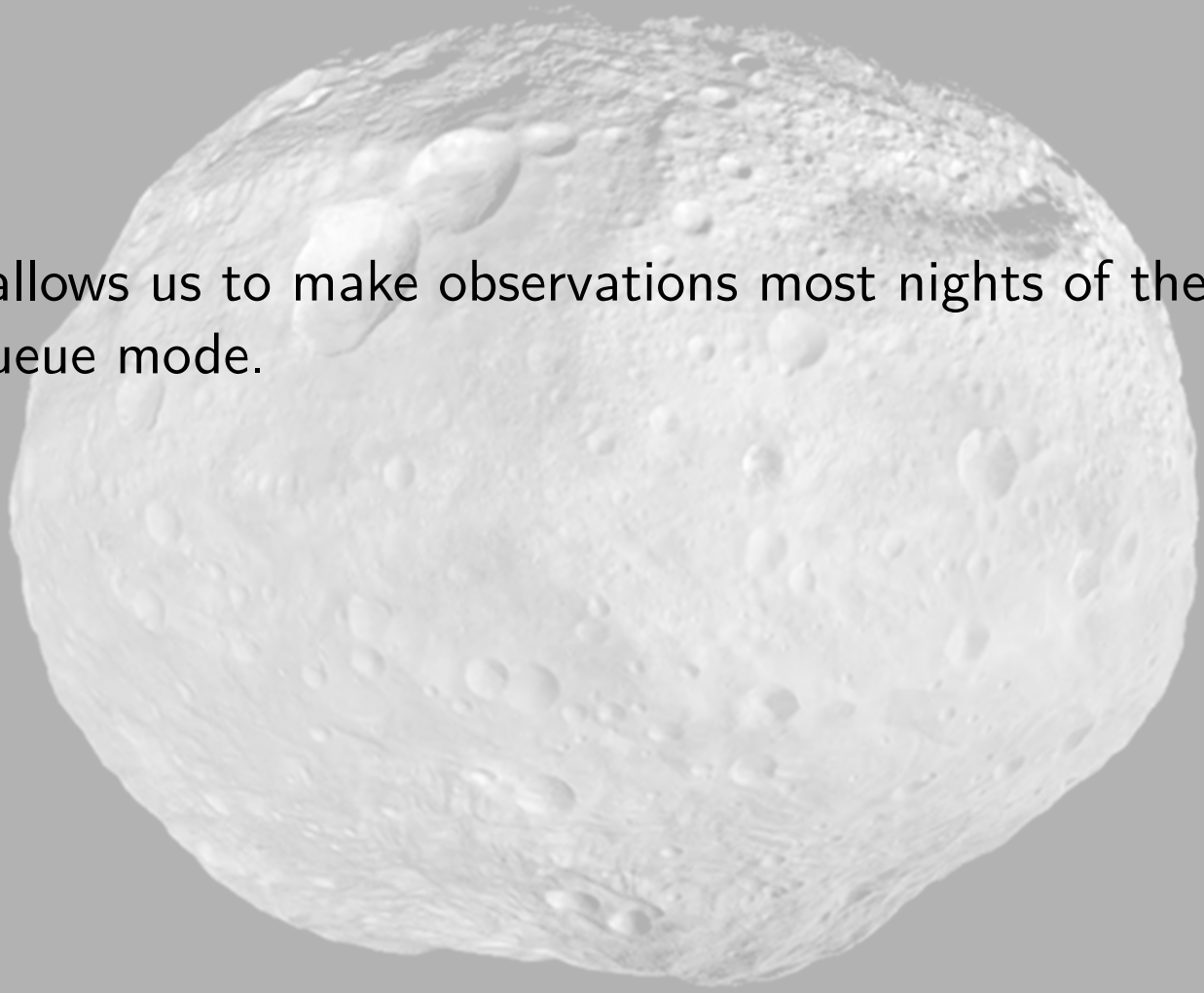
Rapid-response

Automated selection of the recently discovered objects, before they fade away.

Watson et al. 2012

Project's goals



Facilities allows us to make observations most nights of the year in robotic/queue mode.

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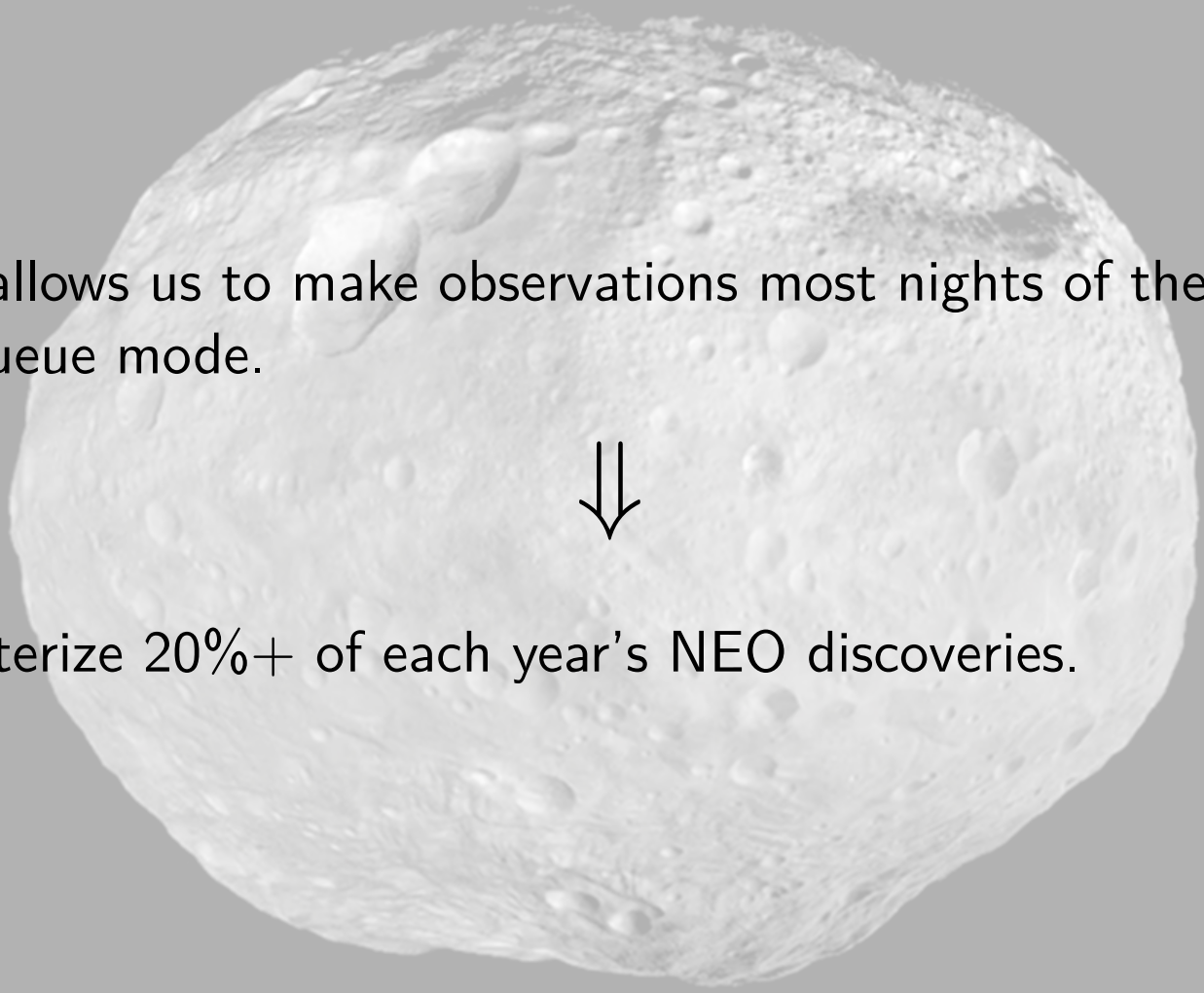

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$\Downarrow$

- Characterize 20%+ of each year's NEO discoveries.

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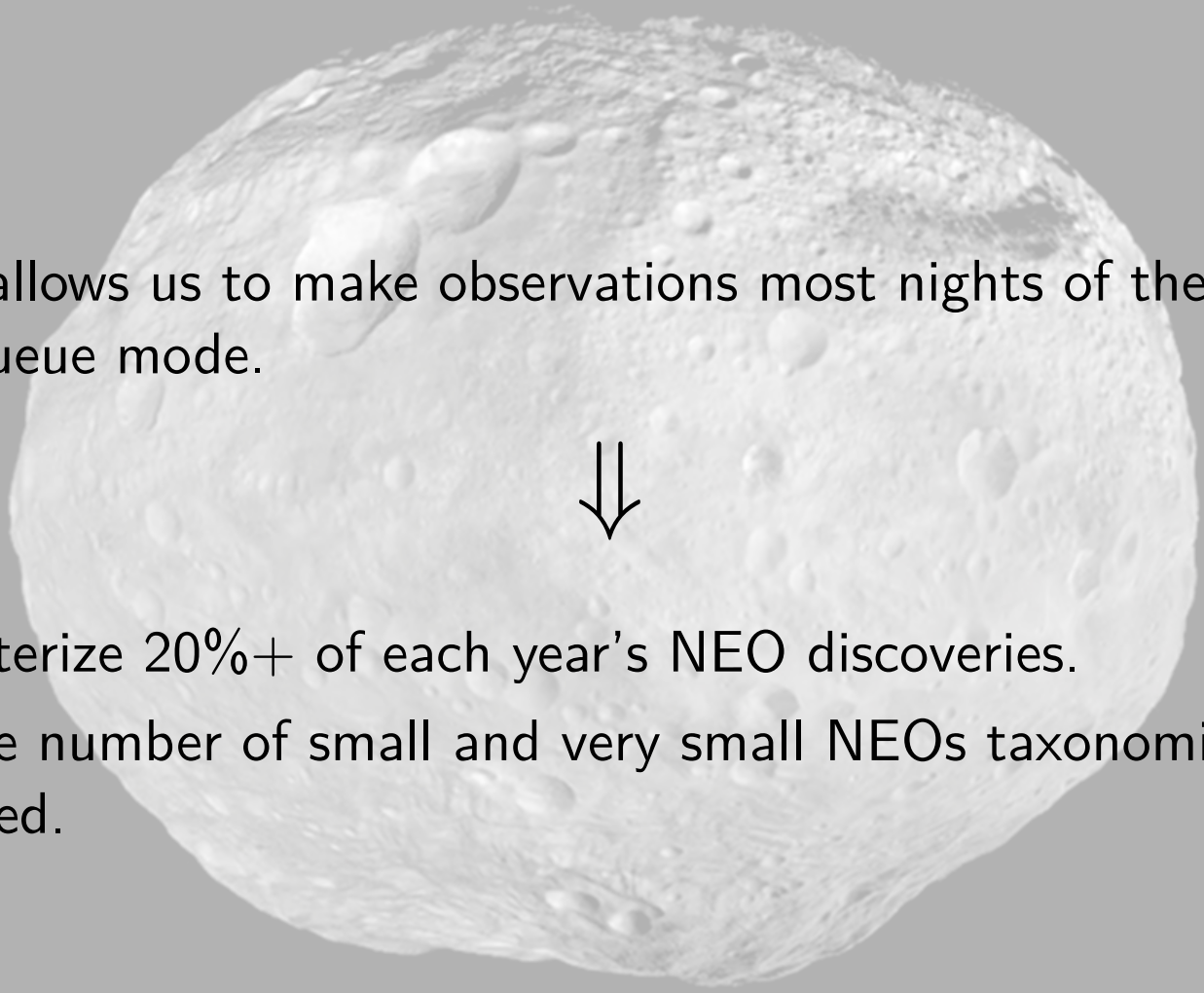
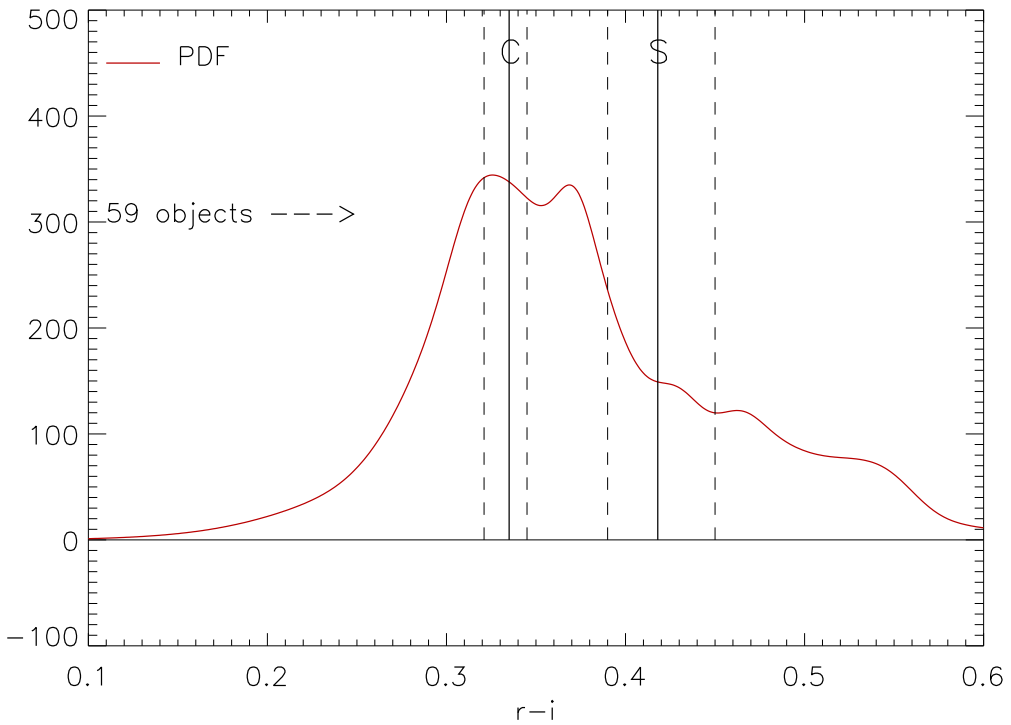


Facilities allows us to make observations most nights of the year in robotic/queue mode.

$\Downarrow$

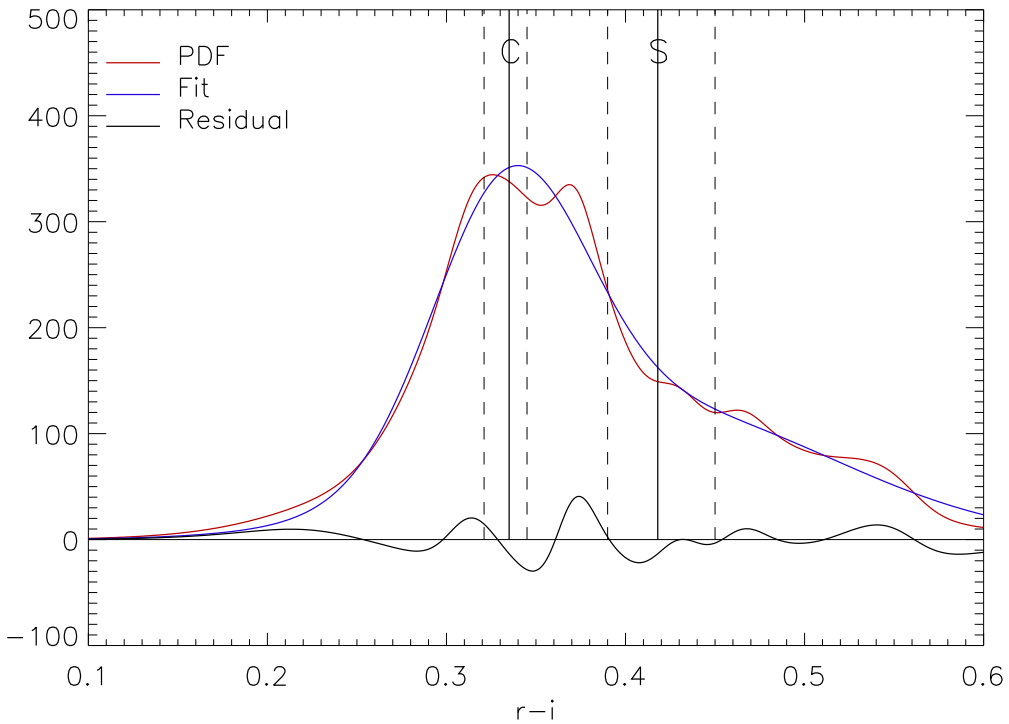
- Characterize 20%+ of each year's NEO discoveries.
- Increase number of small and very small NEOs taxonomically described.

Preliminary results



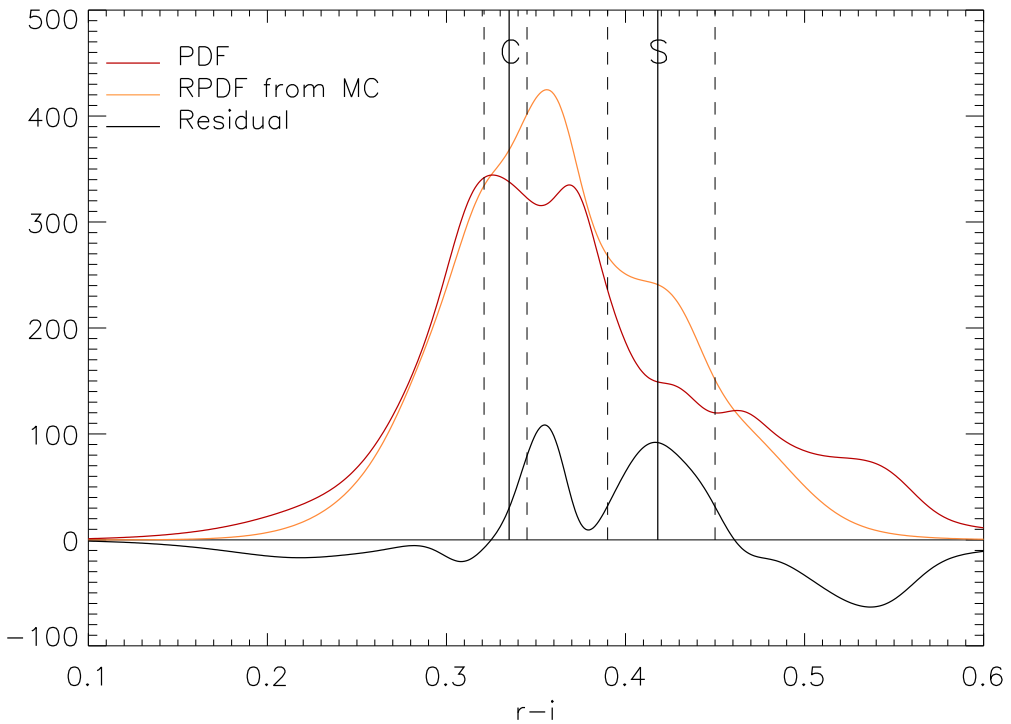
Probability Density Function of the sample.

Preliminary results



Probability Density Distribution of the sample. Gaussian fit centered at C- and S-type *r-i* indexes. $S_f = 44.2$.

Preliminary results



Comparation of the PDF with a Random generated PDF. $S_f = 44.07$.

Conclusions

- By using two different methods to obtain our results, we found a 44% of S-type asteroids in our sample.

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- By using two different methods to obtain our results, we found a 44% of S-type asteroids in our sample.
- Preliminary results are in good agreement with our previous work (Mommert et al, 2016).

Thank you.

Introduction

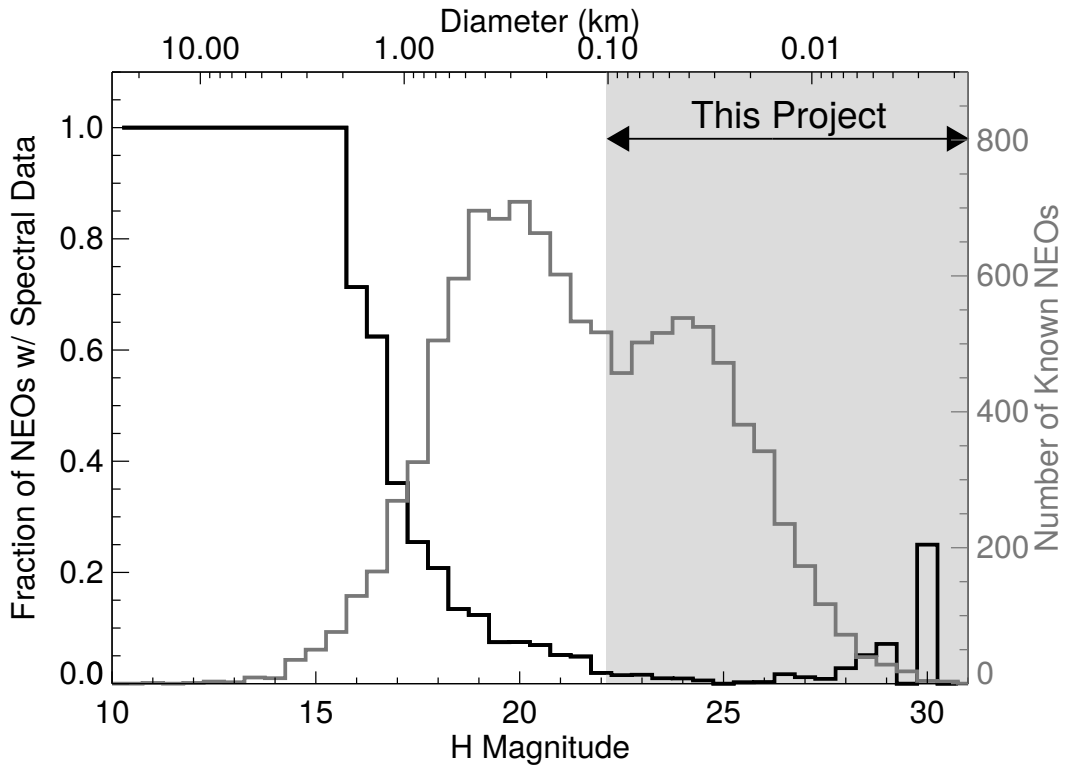


Figure 1: Fraction of known NEOs with any form of spectral data as a function of size (Provided by N. Moslovitz).

Introduction

This project

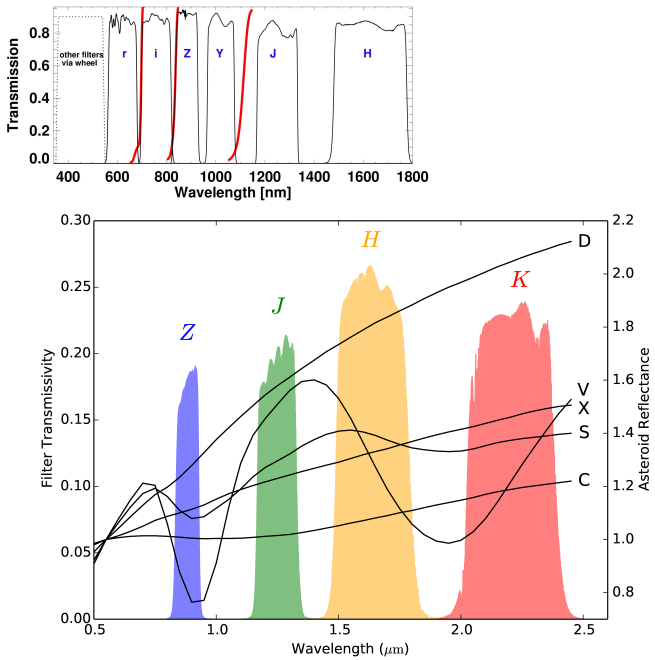


Figure 2: NIR photometric colors are indicative of asteroid compositions. Bandpasses used by RATIR (Watson et al. 2006) and UKIRT (Hewett et al. 2016) . Also plotted the averaged asteroid reflectance spectra (DeMeo et al. 2009) of the main asteroid types.

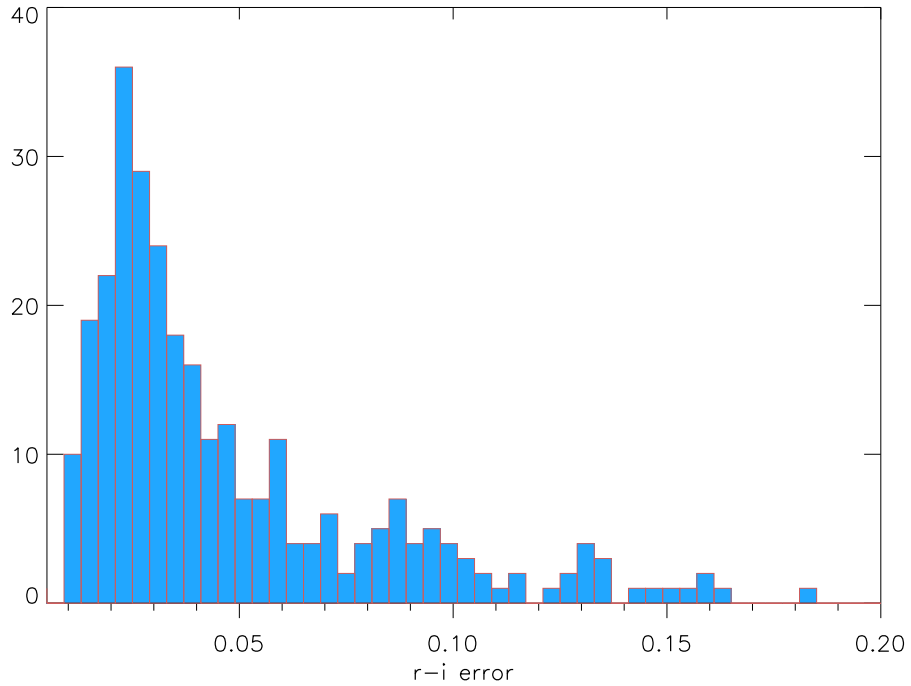
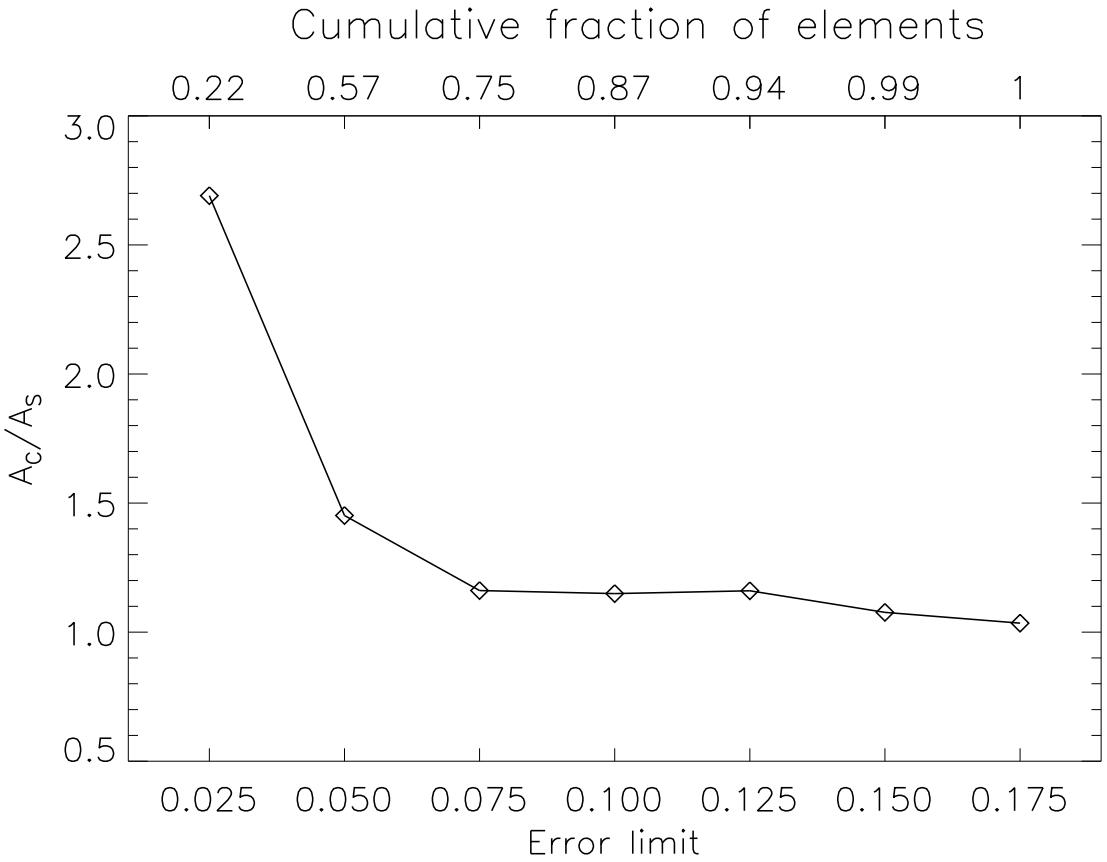


Figure 3: Error distribution for the full sample (no selection criteria applied)[**??**].


Cumulative fraction of elements
0.22
0.57
0.75
0.87
0.94
0.99
1
3.0
2.5
2.0
1.5
1.0
0.5
A_C/A_S
0.025
0.050
0.075
0.100
0.125
0.150
0.175
Error limit