



#### Exploring the near-UV for primitive material: from ground based observations, space telescopes, a survey like catalog and Gaia

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#### Observing asteroids

Key points:

- Moving objects
- Reflect light from sun
- Sun not visible at night (not a surprise)
- Solar Analogues



### Primitive asteroid reflectance spectra

Key points:

- Pristine building blocks
- Composition of different reservoirs
- Track the water (and other life related components)
- Featureless. Only three possible absorptions.



# How we classify asteroids?



Key points:

- Using bands
- Changes in slope

#### NUV forgotten in the XXI century

Depth of 1µm silicate absorption increases



2002 Bus 0.44–0.92µm



Average spectral slope increases

2019 Bus-DeMeo 0.45–2.45µm



Depth and width of 2µm (pyroxene) absorption band increases up to right Depth and width of 1µm (olivine) absorption band increases down to left

#### Solar Analogues



#### What we see from ground:



Tatsumi et al (in prep.)

### What we see from ground:



Tatsumi et al (in prep.)

Slope in NUV range (0.37-0.42)

#### What we see from ground (+HST):



Tatsumi et al (in prep.)

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● HST ── TNG ── ECAS ── original Gaia ── corrected Gaia

# Gaia DR3

- 60000 asteroids with photospectra
- 16 bands from 0.37 to 1.034 microns
- Systematic reddening in our region of interest due to Solar Analog selection.



Tinaut-Ruano et al (submitted) a

#### Ground compared to space Gaia:



Tinaut-Ruano et al (in prep.) b

#### What we see from space (Gaia):



Tinaut-Ruano et al (in prep.) b

# What we see from space (Cassini):





Tinaut-Ruano et al (in prep.) c



Tinaut-Ruano et al (in prep.) c

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### Conclusions

- Near UV is a key wavelength range to explore in asteroid reflectance spectra and deduce hydration, composition and evolution.
- We have already found a correlation between NUV absorption and the 0.7 microns band, related with hydration, among primitive asteroids with different nature using ground based observations and GAIA.
- We have found another correlation between NUV absorption and the 3 microns band, related with hydration, organics and the topography among the primitive material in lapetus surface.

#### Gracias!

#### Thank you!

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