

2016 Euclid Photometric Calibration Workshop: Objectives

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SOC, LOC

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Initial question: understanding **absolute** photometric calibration

Driven by the top level calibration requirements (CalCD-A)

- ❑ What is meant by absolute photometric calibration? What are the assumptions...in the visible, in the near-infrared? How far can we go in accuracy using standards?
- ❑ Which cases need absolute photometric calibration? For the core science, ...for legacy?
- ❑ What can we achieve with Euclid?
- ❑ Need separate specification of the photometric calibration for the different subsystems? VIS, NIP, NIS blue and red
- ❑ How do we extract the fluxes....OUs?



Several positive and constructive responses. It became apparent that we needed to revisit the objective:

Gigi Guzzo:

"... for GC the most stringent requirements are in fact on ***relative*** calibration, which we require to be spatially (over detectors/fields/survey) and temporally homogeneous. This is where we need to finalise fully our calibration scheme. So I believe the workshop should broaden a bit and assess Euclid "photometric/spectrophotometric calibration" in general."

"I am taking for granted that 'photometric calibration' includes by default 'spectrophotometric calibration', which for the Euclid redshift survey is the most important one.

I think we also need to clarify where constraints are in fact absolute or relative...."



Address the following issues

- Absolute photometric calibration
- Relative photometric calibration
- Spectro-photometric calibration
- Core science and legacy science → for a common “photometry” view
- Methodologies
- (Euclid) Standards and conventions → interaction with/among OUs

...to obtain an overview and common understanding of the envisaged photometric calibration and associated aspects...

...specific to the demands of the Euclid community.



- ❑ The designated groups within the Euclid science ground segment responsible for the data processing algorithms - the Organisation Units - are invited to present their calibration tasks.
 - Driven by needs of **OU-PHZ** ← MER, NIR, VIS, EXT
 - Spectrophotometry – SPE ← **NIS**
- ❑ We also invite presentations addressing specific photometry needs for **legacy science** projects.

- ❑ An important workshop element is the sharing of experiences and **lessons learnt from other ground and space based projects** in the light of the Euclid needs.
 - Gaia, Spitzer, HST, DES, JWST ...



Sessions

1. Euclid capabilities and spectro-photometry calibration
2. Photometric systems and absolute photometry
 - *Panel:* Need for absolute photometry?
3. Photometric calibration of imaging datasets
4. Spectro Photometry
5. Photo-z Estimation and Calibration
 - *Panel:* How to obtain throughput curves for VIS, NIR, as well as ground based surveys. What about variations in throughput curves as a function of position within the instruments and changes over time? Is there a plan for handling this?
6. Methods, improvements, enhancements
7. Euclid technicalities



Scientific

Ruyman Azzollini (UCL/MSSL)
Anne Ealet (CPPM)
Knud Jahnke (MPIA)
René Laureijs (ESTEC)
Yannick Mellier (IAP)
Joe Mohr (Univ. Munich)
Marc Sauvage (CEA/IRFU/SAP)
Roland Vavrek (ESAC)
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Local

Bruno Altieri (ESAC)
Meiert Grootes (ESTEC)
John Hoar (ESAC)
René Laureijs (ESTEC)
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“Timely” aspect stressed in the workshop title:

2016 EUCLID PHOTOMETRIC CALIBRATION WORKSHOP

And may be repeated at a later stage during the project lifetime.
Proceedings of this workshop will help future discussions.

Proceedings: publishing process to be worked out
Refereed vs. non-refereed



Thanks for your attention!



CalCD A calibration requirements/goals were the trigger

R-GC.1-13: For galaxies that meet the flux limit specified by R-GC.2.1-1, with good redshifts as defined by R-GC.1-3 within the redshift range in R-GC.1-5, the rms fluctuation in galaxy counts within patches of 0.5 deg^2 area induced by flux calibration errors shall be less than 1.0%.

R-WL.2.1-21: The post calibration relative photometric error in NISP imaging shall be less than 1.5%.

R-WL.2.1-26: After all calibrations, the relative photometric error of the VIS Instrument shall be $< 1.0\%$.

G-WL.2.1-27: After all calibrations, the absolute photometric error of the VIS Instrument shall be $< 5.0\%$.

G-WL.2.1-28: After all calibrations, the absolute photometric error of the NISP-P shall be $< 5.0\%$.

G-GC.2.1-13: After all calibrations, the absolute spectrophotometric error of the NISP-S shall be $< 5.0\%$.



Survey Related calibration requirements

G-WS.2.2-16: Euclid will achieve an absolute photometric calibration of $<3\%$ across the survey area in the NIR imaging channels.

G-DS.2.2-19: The post calibration relative photometric error, based on PSF photometry, for NISP imaging in a single filter shall be less than 0.5% .

G-DS-2.2-21: The calibration zero-point in each band shall be measurable to an accuracy $<0.5\%$ from standard stars as bright as 15 mag.

G-DS-2.2-23: After all calibrations, the absolute spectro-photometric photometric error in the wavelength range $0.92 < \lambda \text{ (micron)} < 1.3$ should be similar to that of the wide spectroscopic survey as per R-GC.2.1-12.

