

Update on the MultiPop@LBC

Short abstract: Definition, procurement, installation and first scientific use of a narrowband filter to be installed at the LBC-B instrument. The goal is to highlight stellar populations with different chemical compositions in globular clusters using a large-FoV, 8m-class ground-based instrument.

Team: Federico **Battaini** (PI), Kalyan Radhakrishnan, Davide Greggio, Antonino Milone

Funding: 20k€ minigrant

Budget foreseen: till now only conferences ~1k€

| Item | Estimated costs (k€) |
|-----------------------------|----------------------|
| Filter procurement | 14 |
| Optomechanical and IT | 1.5 |
| Conferences | 2 |
| Shipping Costs | 0.5 |
| InstallationTravel Expenses | 2 |

Conferences and publications

2022

- A talk at the SPIE SPIE Astronomical Telescopes + Instrumentation, Montréal, Québec, Canada
- SPIE proceeding published:
Federico Battaini, R. Ragazzoni, A. P. Milone, G. Cremonese, "Transmission curves of narrow-band filters in large-FoV and fast astronomical instruments," Proc. SPIE 12188, Advances in Optical and Mechanical Technologies for Telescopes and Instrumentation V, 1218821 (29 August 2022);
<https://doi.org/10.1117/12.2629936> - <https://arxiv.org/pdf/2211.10150.pdf>

2023

- [Poster](#) + short talk at the conference **“A multi-wavelength view on globular clusters near and far: from JWST to the ELT”**

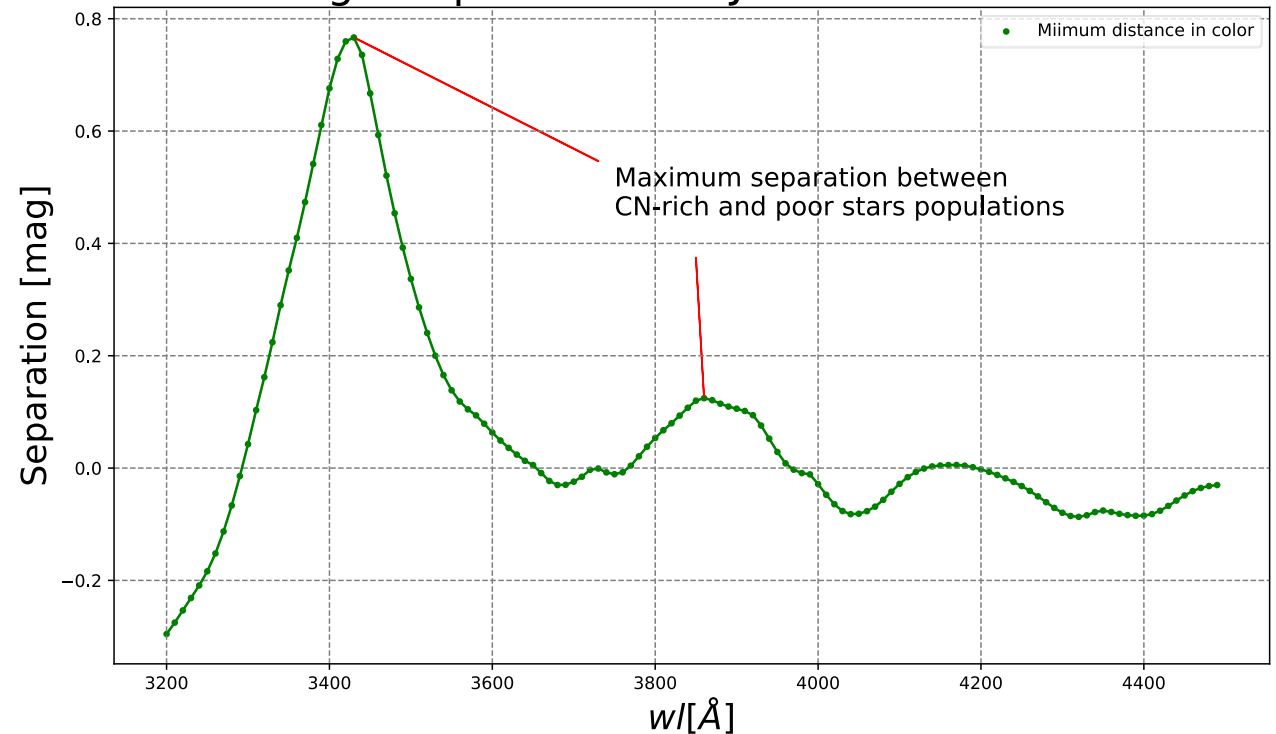
A new way of estimate the best filter to be installed

In 2023 I performed a preliminary study and introduced a new way and algorithm to calculate the best central wavelength of the filter to be installed.

I look for the filter that **maximize the minimum separation between the populations** considering the optical design of the instrument.

I convolved two spectra respectively poor and rich in CN with a large set of filters to scan the spectral region of our interest. We modeled a 10nm-width filter and we moved its central wavelength from 320nm to 450nm. In the plot is the computation of the minimum separation (like in the right-side plots) in the color-index NewFilter-V.

Pop separation, in different color indices NewFilter-V, varying the pivot wl of a JWL-NewCa-like filter



What we are doing now

- Rewriting the code to perform faster simulations with different spectra
- Simulate other indices using combination with the available filters at LBC-B and R

Next milestones in 2024

- Confirm the selection of best filter with the scientific community
- Set up the purchase of the filter
- Install the filter at LBT