

Now I start to write weekly report from Monday

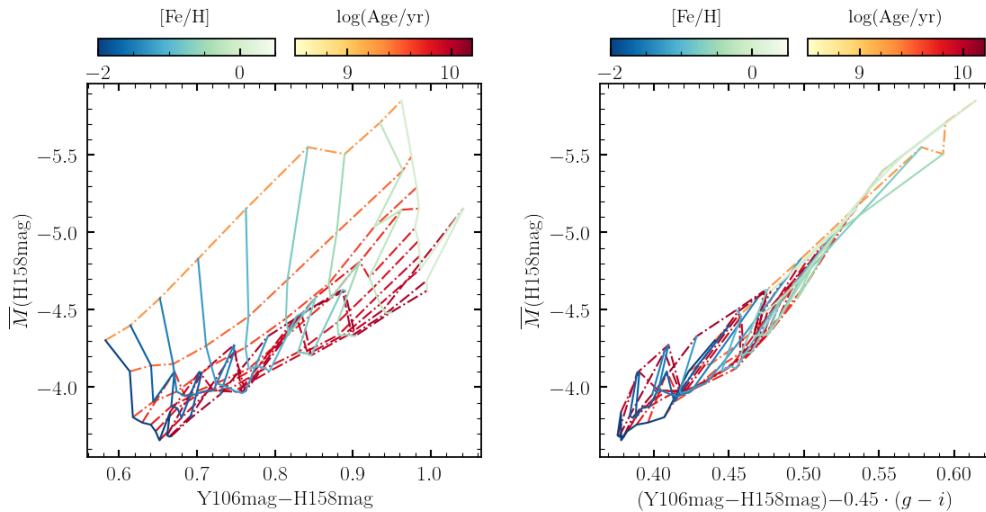
Weekly Report

SBF

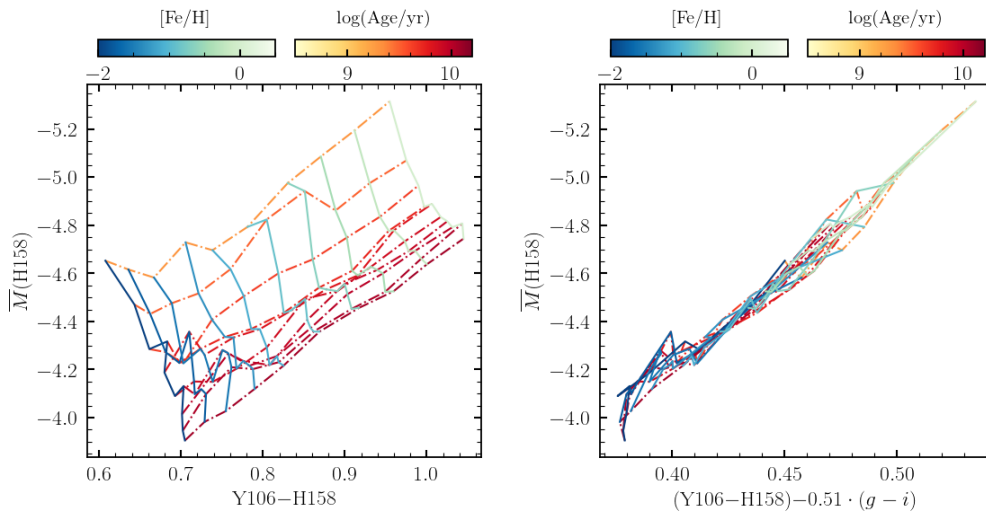
We submitted the Noice of Intent for the Roman proposal titled "Surface brightness fluctuation of nearby dwarf galaxies in the Roman era". The NOI covers most of the thoughts about the proposal, but I didn't add pCMD stuff and the synergy between pCMD and SBF. The NOI was appreciated by Jenny and Shany and Racheal, so I suppose I did some good writing (thanks to Better Call Saul). The deadline for the proposal is March 21st, so my plan is to "finish" the project by then.

The first part is to propose a color-SBF relation in IR which has smaller scatter and thus yields better distance. Per my previous investigations, the scatter can be greatly reduced by combining IR color with optical color. This is based on MIST SSP isochrones. This week I checked PARSEC isochrones and the conclusion still holds.

This is PARSEC :

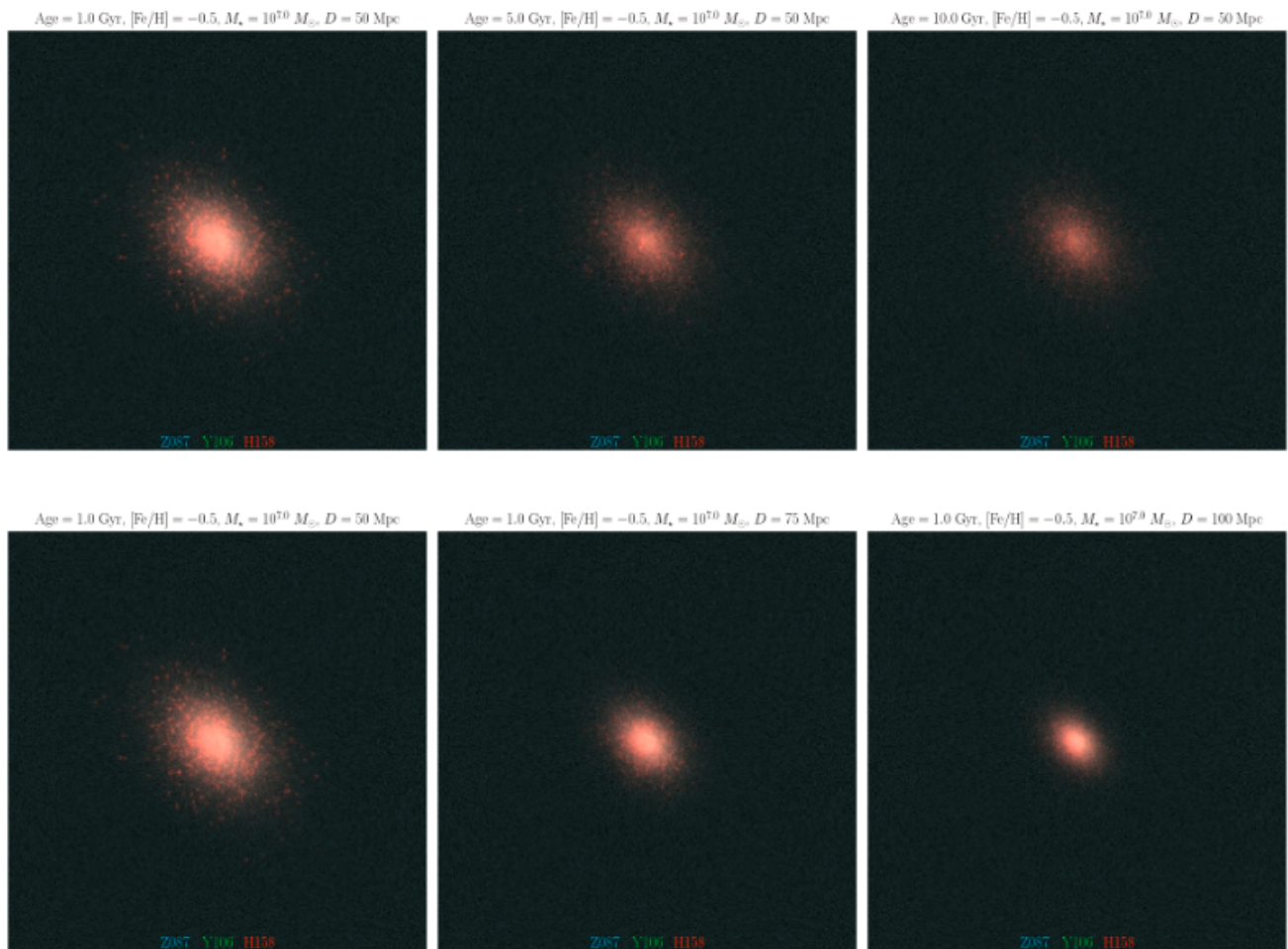


This is MIST:



It is clear that PARSEC and MIST grids are different (left panels), but the scatters can be reduced by combining IR and optical colors, despite the fact that the coefficients are a bit different. I'm now confident that this idea would work for real galaxies. The next step is to calibrate this using realistic stellar pop, or using IR observation datasets. Jenny pointed out **ANGST** (PI: Dalcanton). Racheal will have insights into this.

The second part is image simulation. By doing some hacking, I made image simulation using **STIPS** much faster (by a factor of 10 or more). The trick is that PSFs are not super-sampled and added to the image, so the star in the image will NOT have sub-pixel precision. This will be a caveat, especially for those galaxies that are quite far.



The above figure shows how the image changes with age, and distance. It's :cool:!

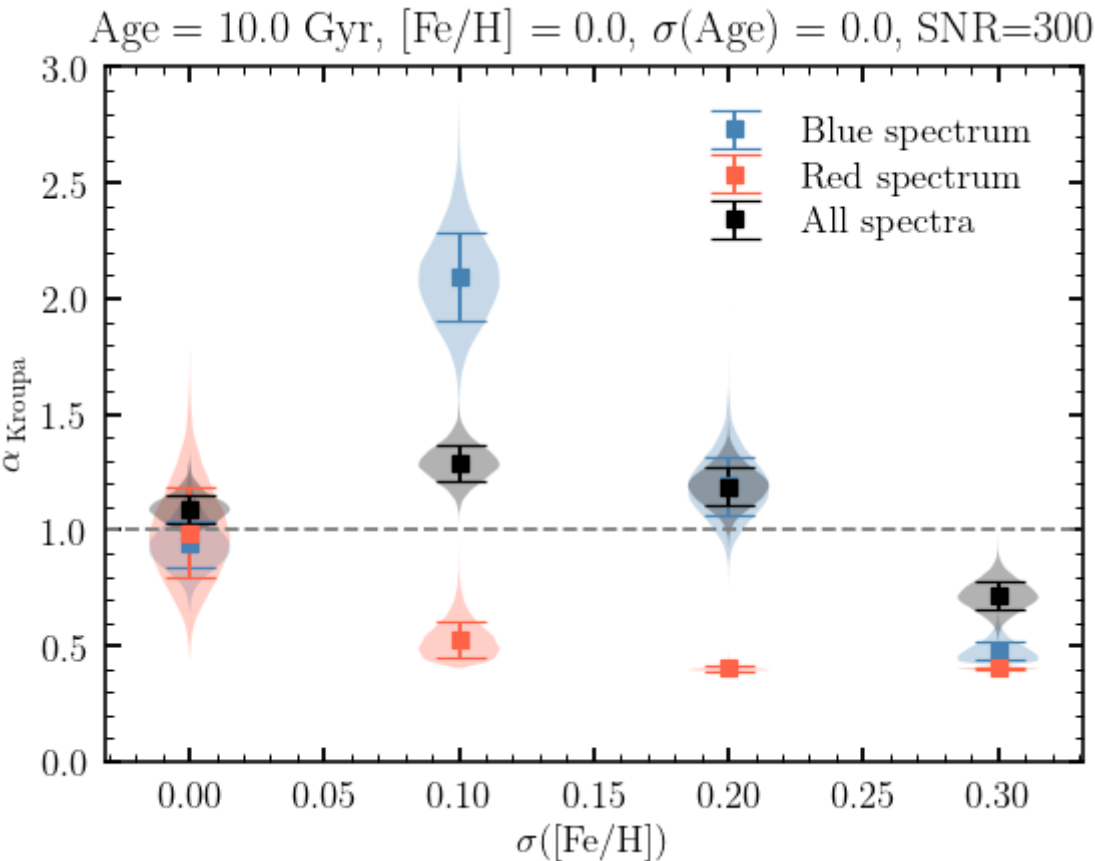
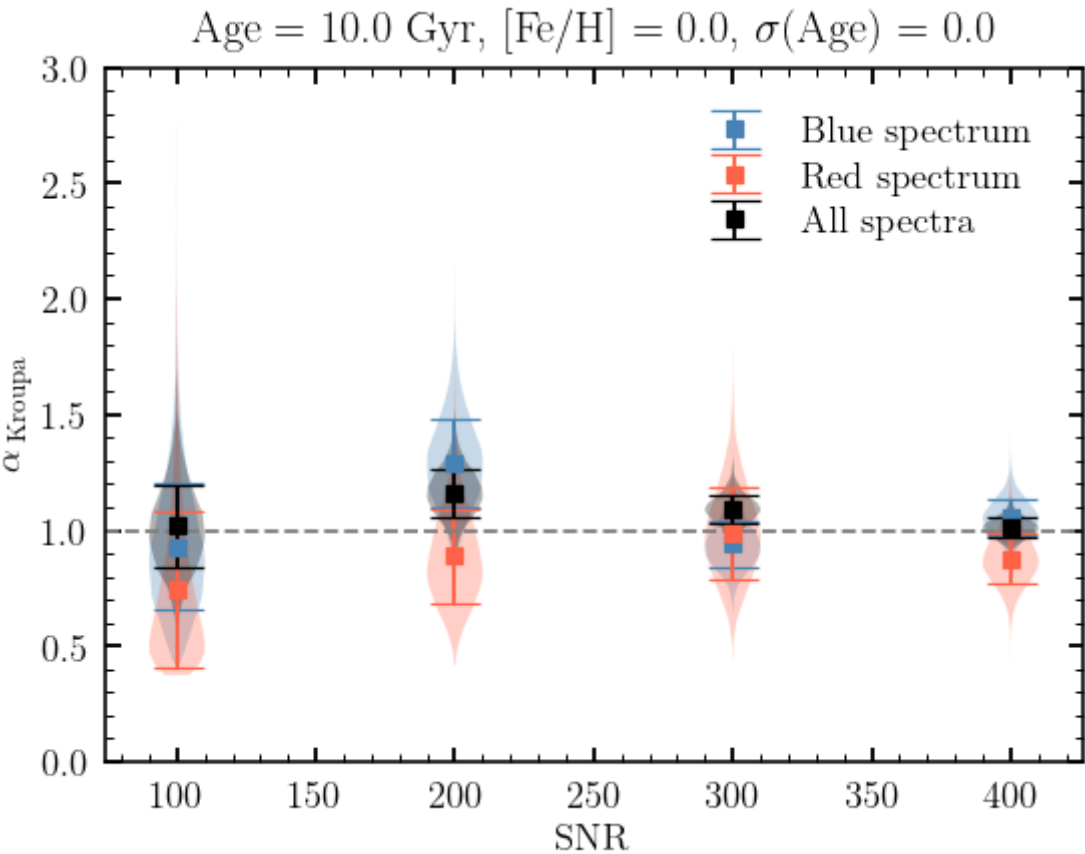
The next step is to measure the SBF signal from the image (with mild noise, as shown), and see if I can recover the distance to some good precision. I will be using Scott's code, but Shany suggested I better talk to Johnny about his code. I said "Johnny's paper is my Bible now" :)

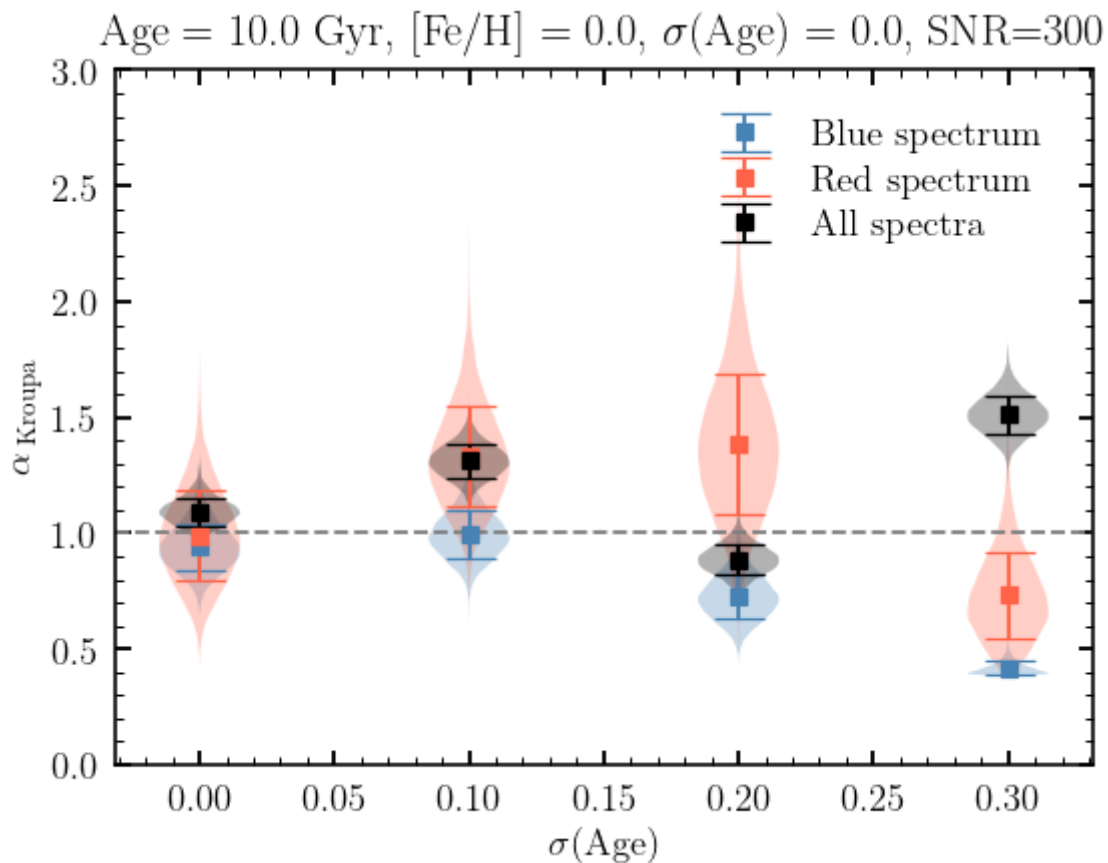
UPG paper

I made up my mind to write the UPG paper on Friday. I finished the intro, and now writing the "data and sample" section. My plan is to 脱产写paper for the whole next week.

IMF

It's been tough... I got some not-so-reasonable results from running MCMC.





It might be because MCMC chains got trapped in the local minimum too often. Meng suggested I can remove `imf1` and only model `imf2`, which reduces the degeneracy and dimensionality. Yuan-Sen suggested I can run multiple MCMCs and check convergence. Maybe try `dynesty`?

Misc

Today is 除夕, and now it's 5pm and I'm sitting in my office in Peyton. This week is less hectic than those weeks in the middle of the semester, but I still didn't get peace in my heart. Sometimes I feel anxious and my heart doesn't feel good (a bit heart palpitations, and short of breath before going bed).

This week I mostly listen to blues, electric guitar, SRV. Steve recommended Joe Bonamassa, who is also a popular blue guitarist. I was thinking about learning guitar in order to play blues. Then suddenly I realize why not play blues on piano. Yeah, let me learn piano first, since I don't need a teacher for that. I bought a "Hanon" piano book today as a (good) start.

Readings

Rapid Environmental Quenching of Satellite Dwarf Galaxies in the Local Group

- [#weisz](#) , [#dwarf](#) One of the classic MW satellite quenching paper
- "dearth"

Using the Tip of the Red Giant Branch As a Distance Indicator in the Near Infrared

- [#SBF](#) , [#TRGB](#) , [#mcquinn](#)
- Similar to SBF, the IR TRGB also strongly depends on stellar pop. Optical TRGB abs mag is a constant over galaxy color (to an accuracy of 0.02 mag!)!!!
- After calibrating IR TRGB based on the colors, the TRGB magnitude can have a scatter of ~ 0.02 - 0.05 mag (0.9%-2.0% precision in distance). Quite good though. But it seems to me that there are many over-simplification here. It's unclear to me how to calibrate this thing with observation... All are based on SSP models.

The many reasons that the rotation curves of low-mass galaxies can fail as tracers of their matter distributions

TBR

Formation of globular clusters in dwarf galaxies of the Local Group

- [#GC](#)