



After the discussion during office hours today with Dr. Renzo, I finally realized my mistakes. First, the stars I plot here are unlikely to be the stars in NGC 5139. Compared to the actual data, these stars are brighter (compared to around 8 absolute magnitude) and cooler (compared to around -1 bp-rp) than the actual stars in NGC 5139 clusters. Second, these stars are most likely younger main-sequence stars and most likely do not include white dwarfs or giants star looking at the loosely distributed stars in this diagram. I have realized that the mistake I have most likely made is that I needed to cut the parallax correctly. I did not know that a feature allows me to take a range of parallax. I could have known the actual position of this cluster by converting the distance to parallax and taking the range for it using the feature in Gaia. Instead, I only took the aperture radius, and most likely I have overestimated the area of this cluster (I took the radius equal to about 100 arcsecs). This leads to all the background stars lying between our line of sight to the cluster to be included. And since the system is capped at 2000 stars, the stars I plotted here are most likely the background stars on the way to the cluster and not the stars in the clusters themselves. Also, these stars appear to be pretty young (as they are bright), which is a big contradiction to NGC 5139 since the stars there are old (around 12 billion years old). The MESA age data has demonstrated this clearly as the main sequence lines on the MESA data stretch to the higher magnitude stars as well.