The age of a star is one of its most important, yet difficult to determine, quantities. Difficulty: The observable features of stars---their luminosities and temperatures---change very slowly while on the main sequence. This is particularly true of low-mass K and M dwarfs. Isochrone fitting is currently the most productive method to infer ages for individual field stars [1] [2][3]. However, these ages can often have uncertainties that are more than 50% for K and M stars.

Assumptions:
- Age velocity dispersion relation (AVR), vertical velocity dispersion increases with age [4].
- Gyrochronology [5][6], stars spin down overtime.

Method:
- Stars with similar temperature, Rossby number, absolute magnitude, rotation periods should have similar age.
- Bin in 4-D phase space and obtain Gyro-Kinematic Ages for around 30,000 Kepler Stars

Yuxi(Lucy) Lu, Ruth Angus, Jason L. Curtis, Trevor J. David, Rocio Kiman

Motivation

Method

Results

References

[1] Nordstrom et al., 10.1051/0004-6361:20035959
[2] Buder et al., 10.1051/0004-6361/201833218
[3] Berger et al., arXiv:2005.14671
[4] Yu et al., 10.1093/mnras/stx3204
[5] Barnes et al., 10.1086/367639
[6] Barnes et al., 10.1086/519295