

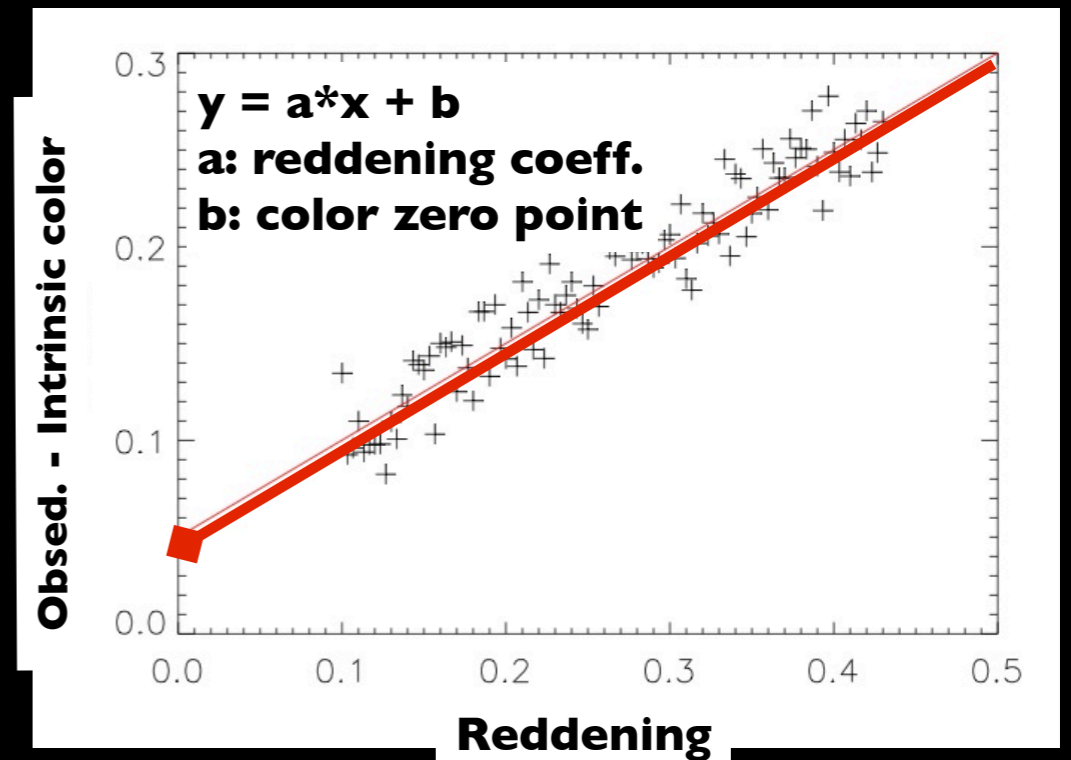
A **MOS-based** method for color calibration to a few mmag precision & implications on Galactic archeology

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-- using millions of spectroscopically observed stars as color standards

- Requirements:

- A calibrated field to define intrinsic colors as functions of T_{eff} , Logg , $[\text{Fe}/\text{H}]$
- Extinction of calibration stars in target fields are known



- Stripe 82 is re-calibrated to **2-5 mmag** accuracy

- Intrinsic widths of $[\text{Fe}/\text{H}]$ -dependent stellar loci are **zero**

- **The tools of metallicity-dependent stellar loci**

- Measure photometric $[\text{Fe}/\text{H}]$ to 0.1 dex
- Measure $[\text{Fe}/\text{H}]$ (0.20 dex) and $E(B-V)$ (0.09 mag) --> **Disk** tomography
- Select halo giants (efficiency: 70%; complet.: 80%) --> **Halo** tomography
- Discriminate binary stars from single stars

Yuan et al. 2015a,b,c,d,e ApJ