University of Sheffield

# Uncovering hidden white dwarf binary populations using Gaia and Galex

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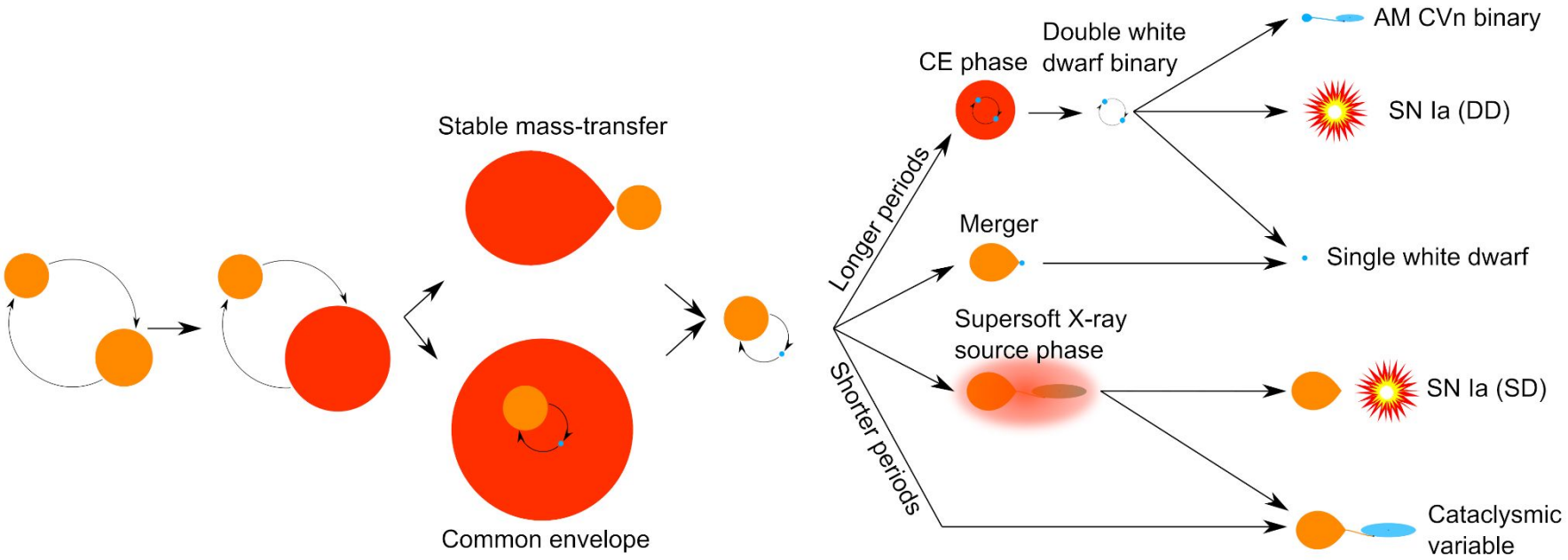
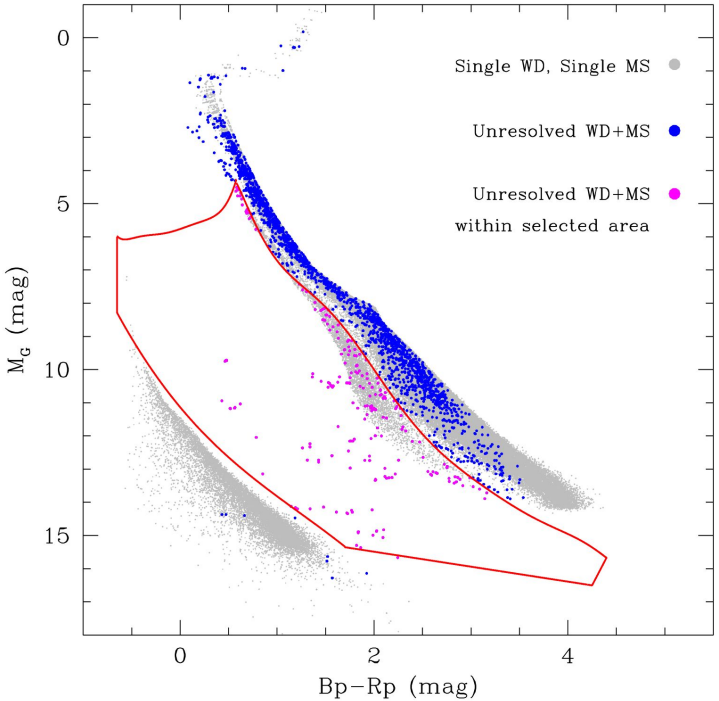
# Why do we care?




S. Parsons, sdOB11 2023

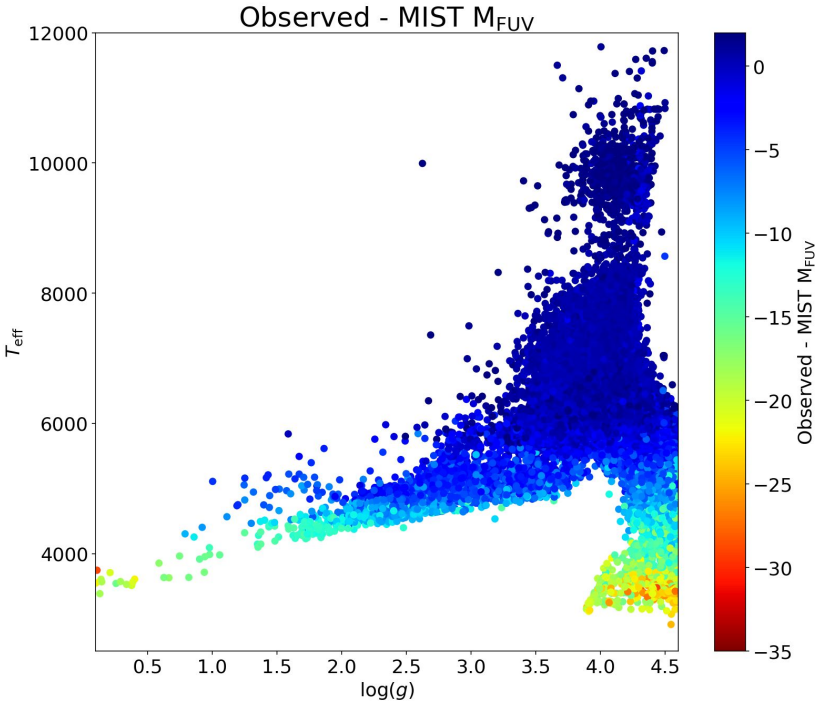
# Finding WD + FGK Binaries

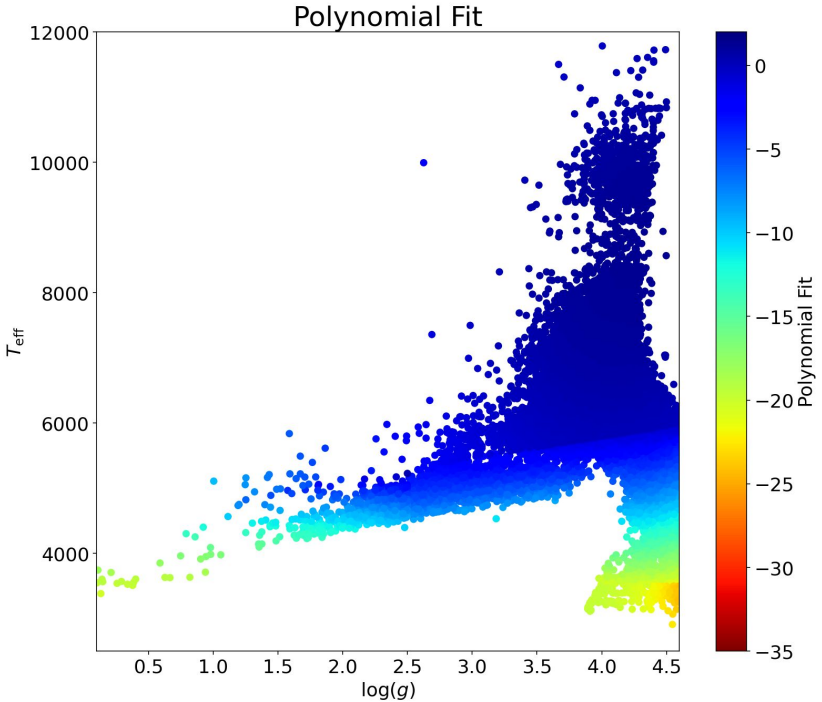



A. Rebassa-Mansergas, 2021

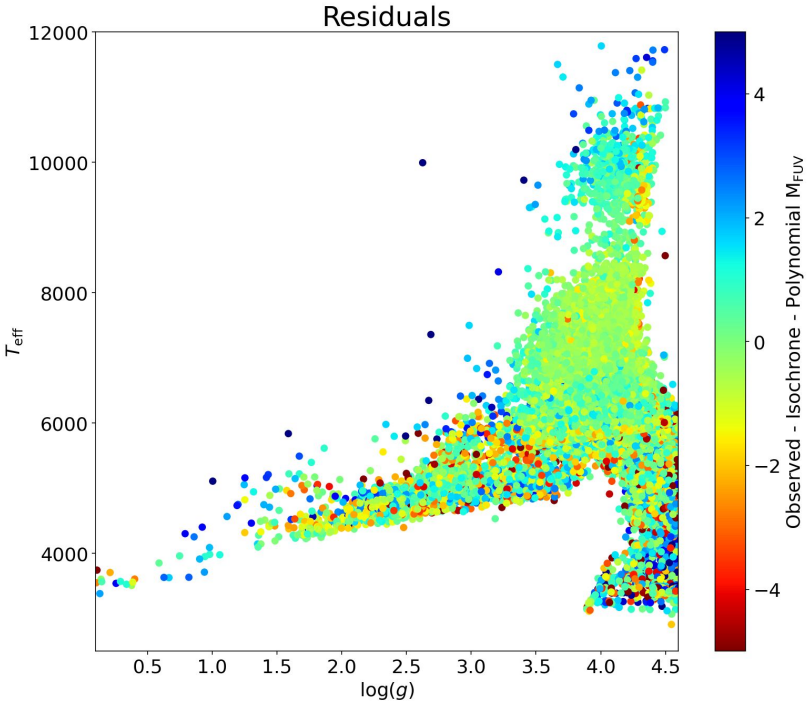
- WD + dM binaries can be found optically (the red region of the plot)
- WD + FGK binaries generally cannot be found optically
- We find our WD + FGK sample by their UV excess.

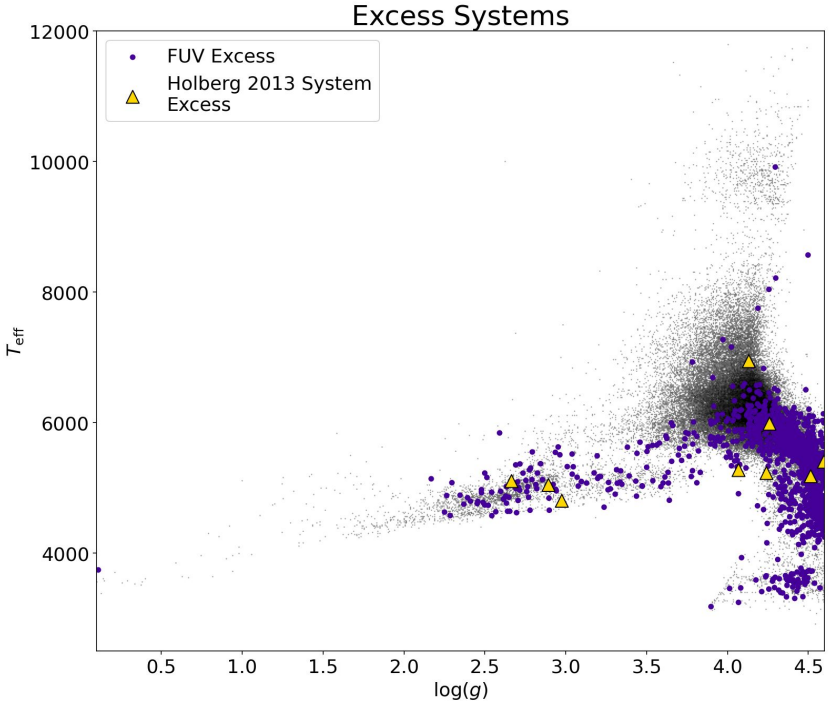
# UV Excess Method



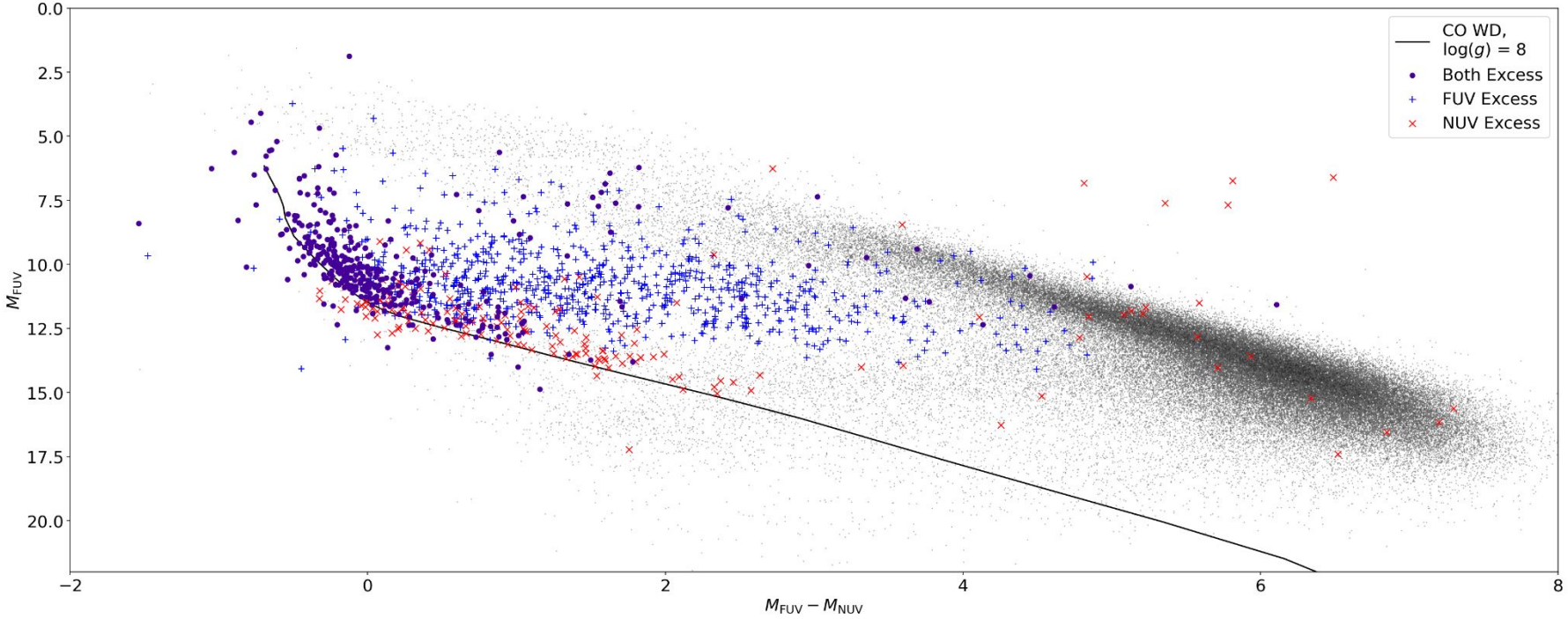



# UV Excess Method

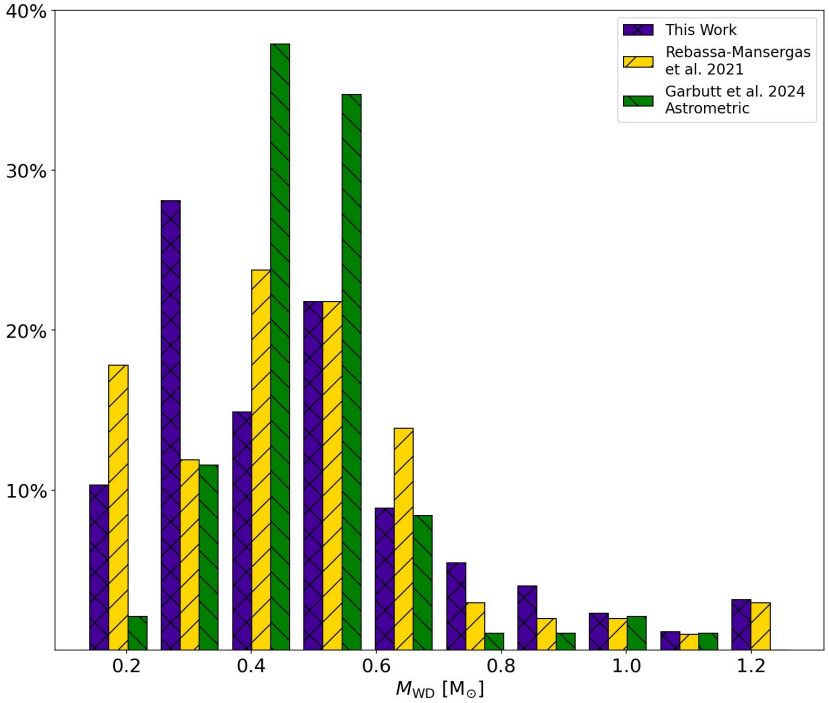


# Results: Our Sample

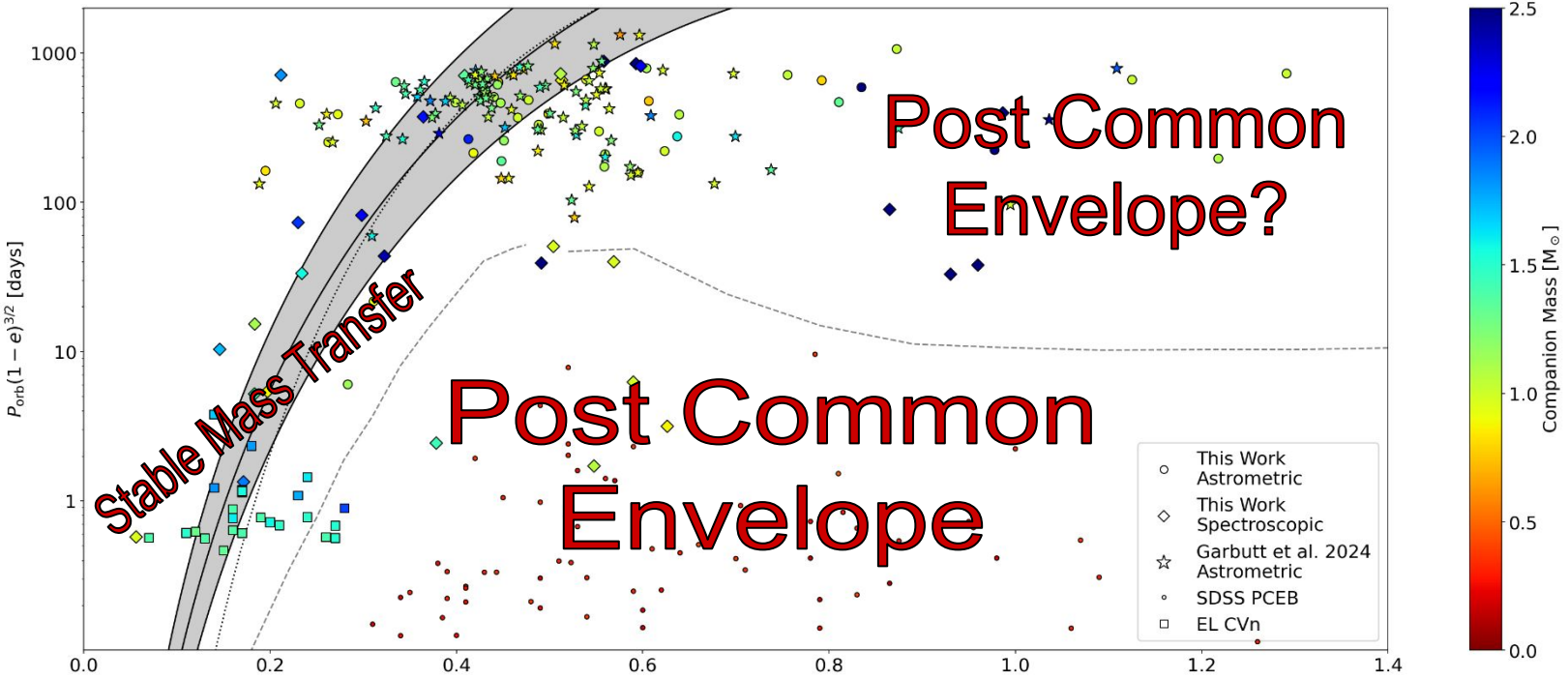


# Results: Our Parameters




- Generally good agreement between our current sample, our previous sample, and the previous WD + dM sample of Rebassa-Mansergas et al. 2021
- We are more sensitive to low-mass WDs.

# The Future Pathways

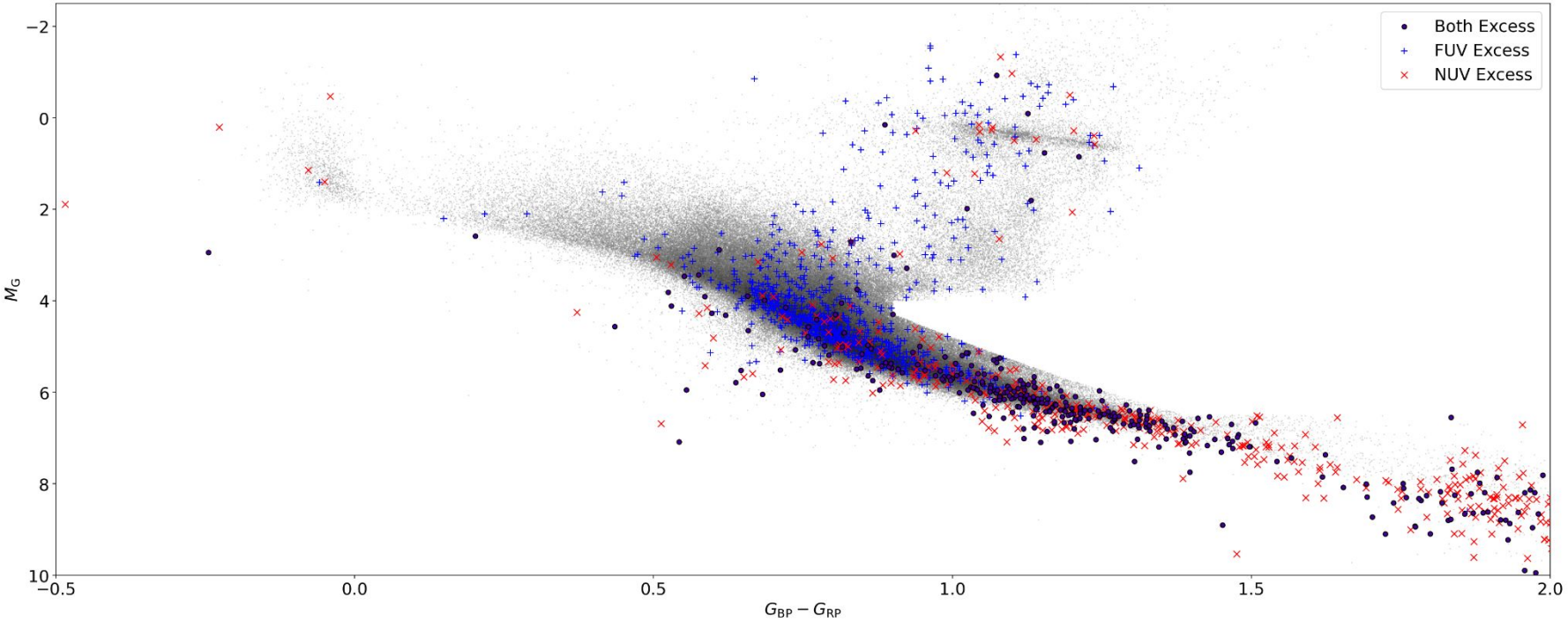


# Conclusions

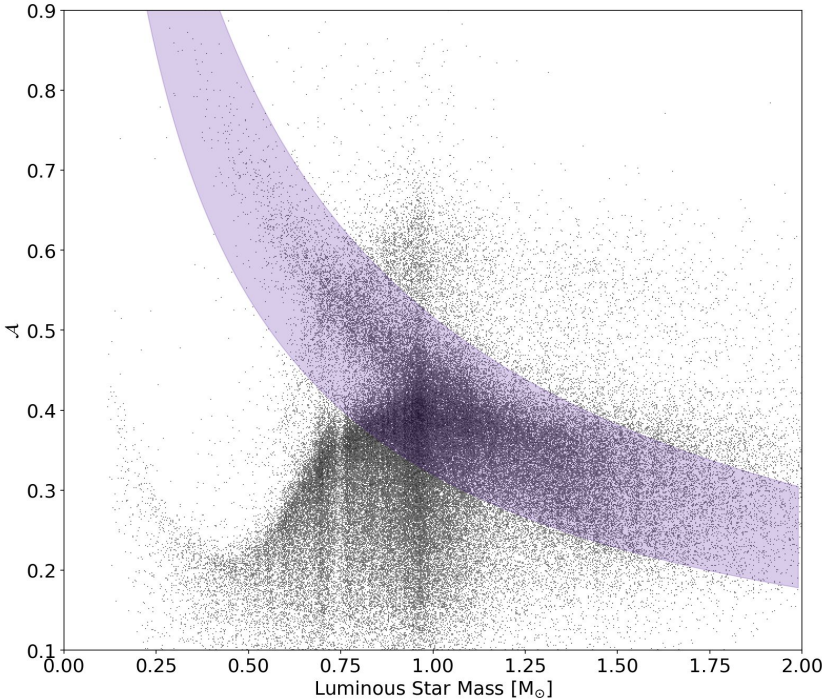
- UV Excess method can find WD + FGK systems well.
  - These systems are the last common ancestor for a bunch of cool phenomena.
  - This method can find WDs next to evolved stars, which can’t be done through astrometry.
- Our distribution is in reasonable agreement with other samples.
- Sample size of 1634 new WD + FGK candidates.
  - Estimated contamination of ~5-10%
  - Follow-up observations required to confirm presence of WD.

# BONUS SLIDES

# Results: Our Sample (now in colour)



# Astrometric Mass-Ratio Function




- $A = \alpha/\varpi\ (M_1/M_\odot)^{-1/3}\ (P/yr)^{-2/3}$
- Highlighted Region: Hidden Binaries with a mass of 0.4 - 0.75 $M_\odot$