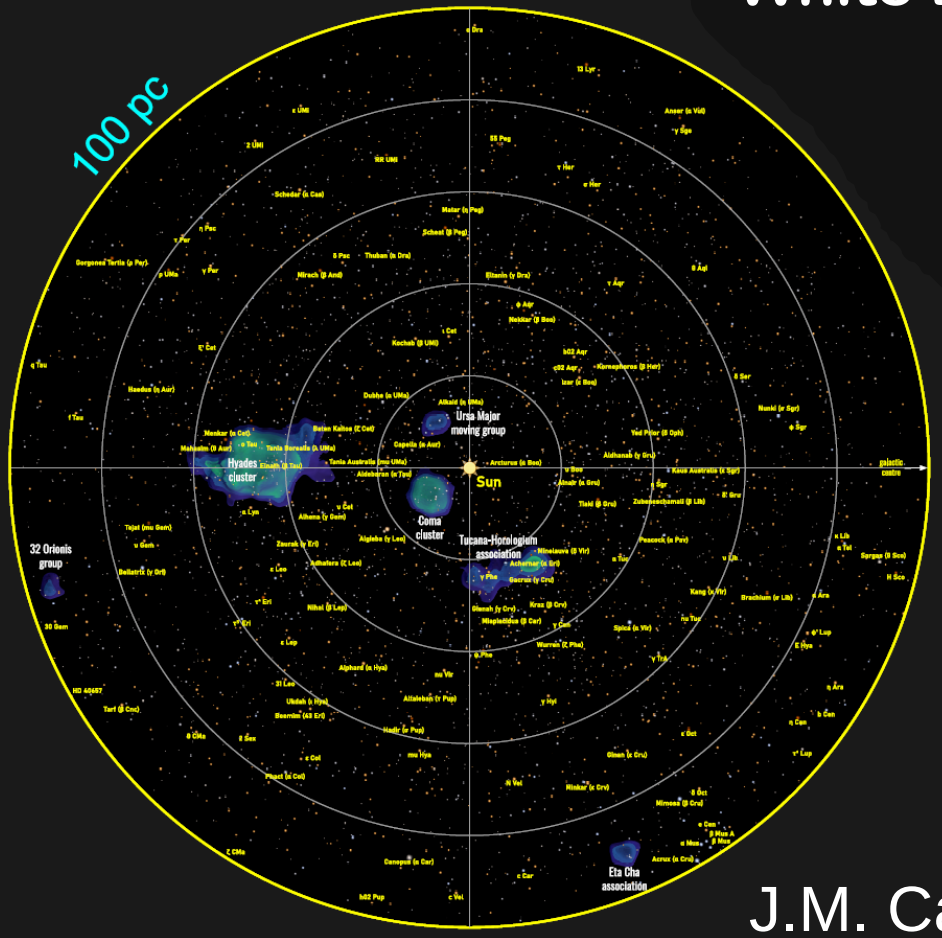
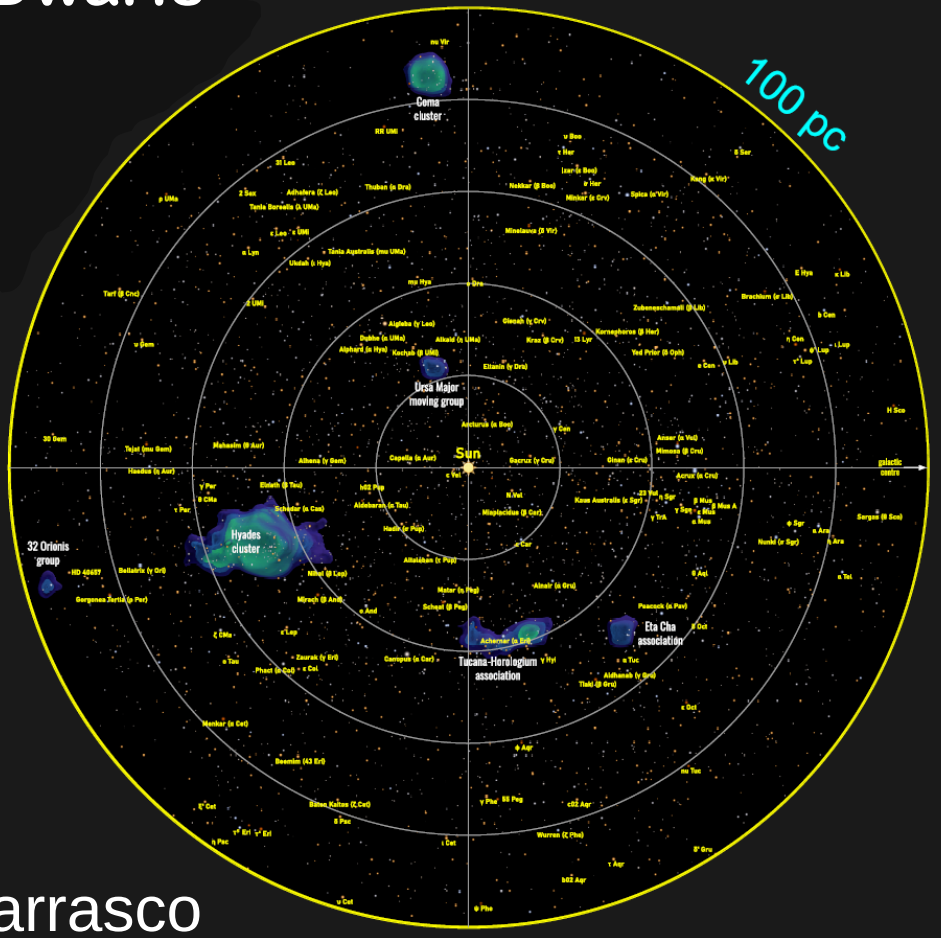
Gaia Catalogue of Nearby Stars:

White Dwarfs





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(+ M.A. Barstow + N.C. Hambly)

Gaia EDR3 en tus manos

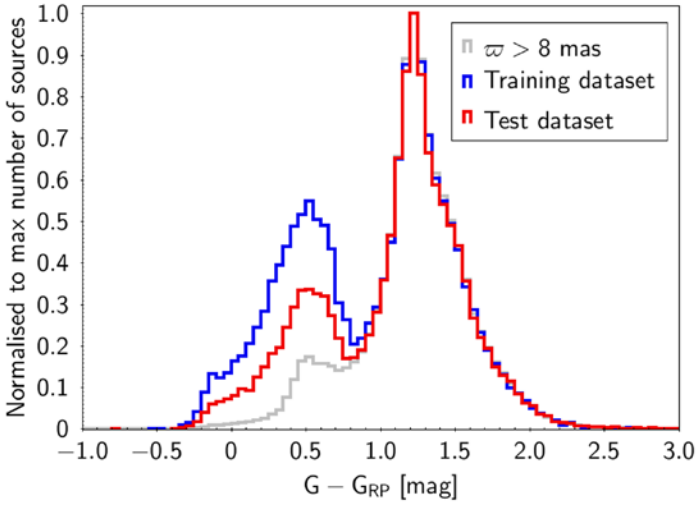
3 diciembre 2020

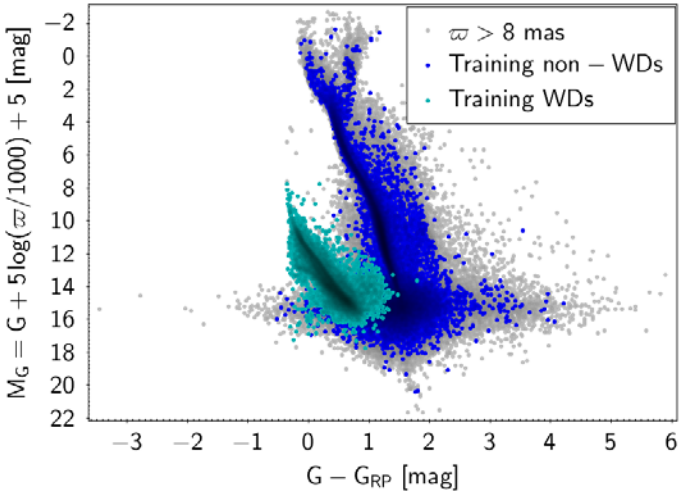
REG Red Española de explotación científica de Gaia

GOBIERNO DE ESPAÑA MINISTERIO DE CIENCIA E INNOVACIÓN

Building the datasets

- 1,040,614 sources in edr3int4 with ϖ>8mas (125 pc) and Gaia photometry in 3 passbands.
- 29,341 known WDs (Gentile-Fusillo+2019, Torres+2019, Jimenez-Esteban+2018)
  - 20,000 for the training, 9341 for the test datasets
- From the other 1,011,273 we choose few random sources (keeping the colour distribution, with 2 intervals with threshold at $G-G_{RP}=0.75$). We choose 2 times the number of WDs for the training and 4 times for the test datasets.
  - 40,000 for the training, 37,364 for the test

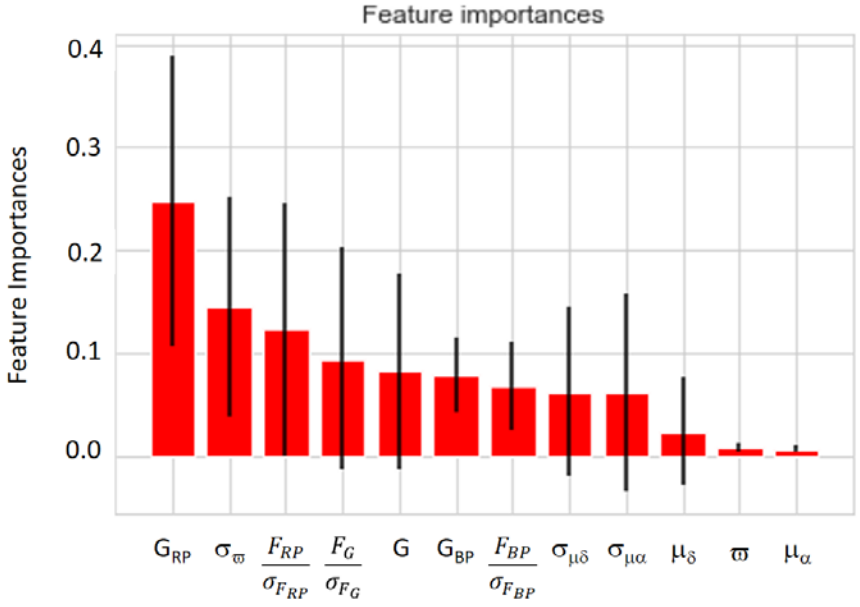


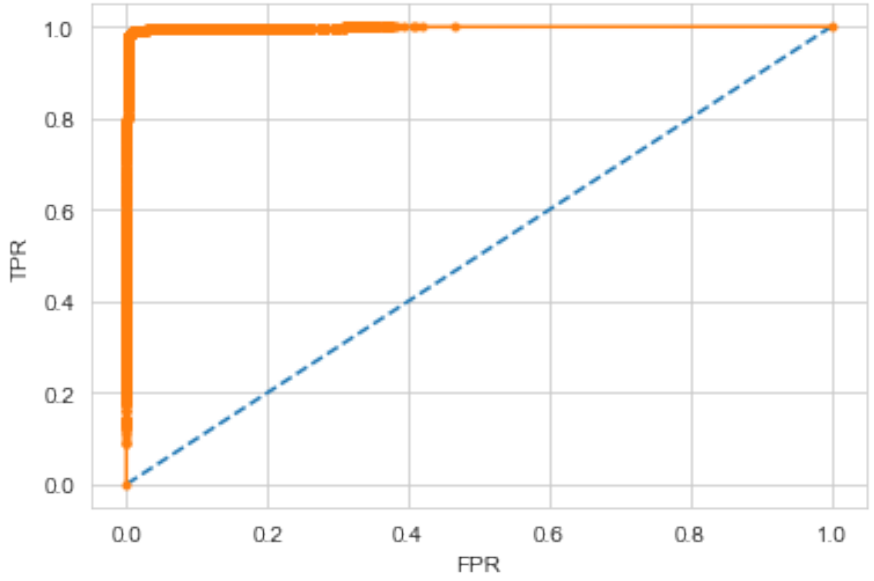


Training and test

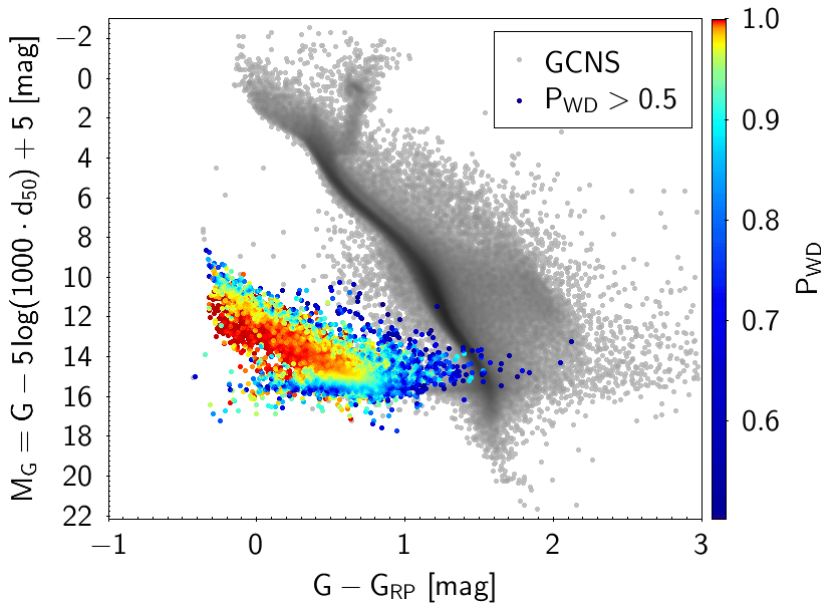
TN=37214	FP=147
FN=181	TP= 9160

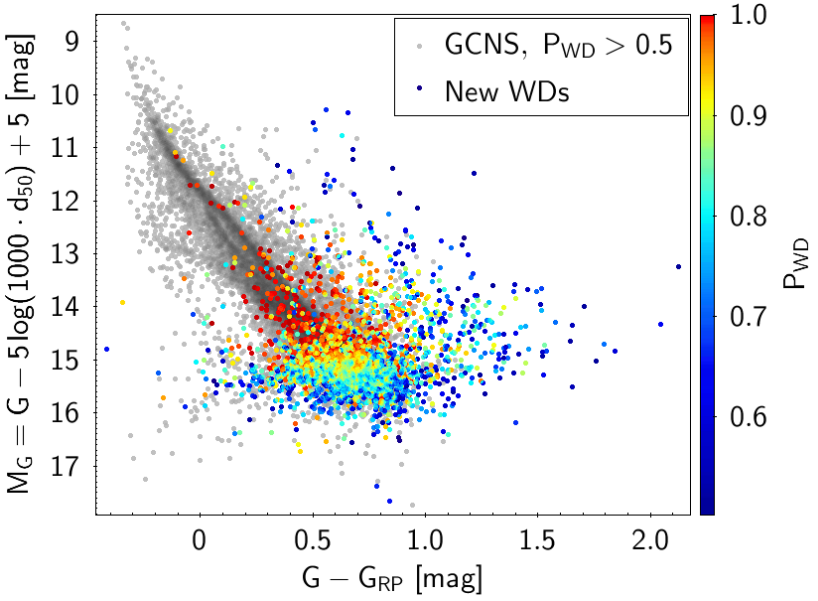
- 9160/9341=98.1 % correctly classified WDs
- 37214/37364=99.6 % correctly classified non-WDs
- 147/9307=1.58 % contamination in WD candidates list
- 181/37395=0.48 % contamination in non-WDs

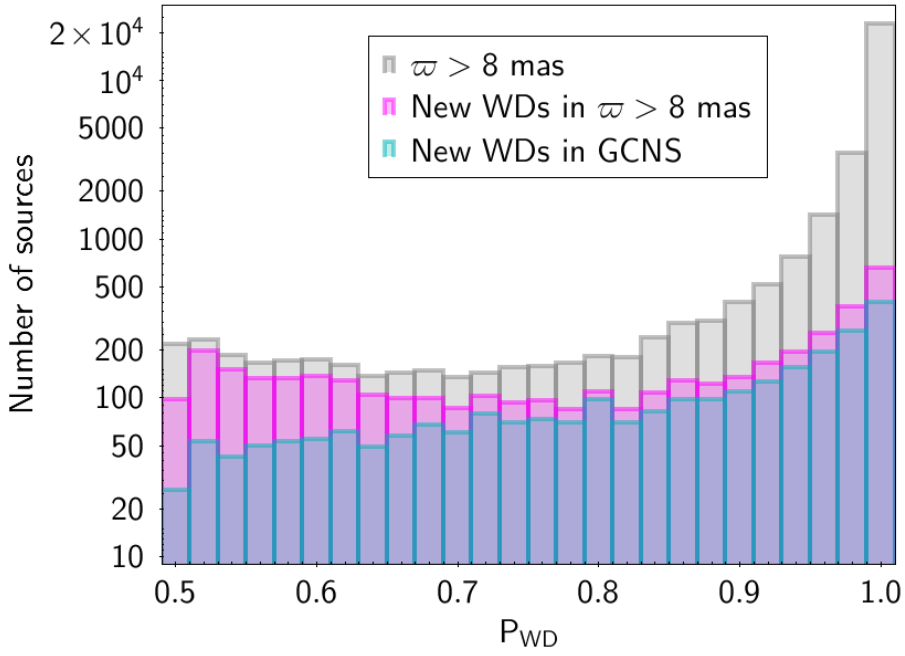




Results







21848 in GCNS with P_{WD}>0.5

- 2553 new

Among the previously known WDs:

- 250 with P_{WD}>0.5 & P_{GF}<0.5
- 45 with P_{WD}<0.5 & P_{GF}>0.5
  --> Suplementary table in CDS

WD Luminosity Function

- Shape of the WD LF reflects historical SFR. It is influenced by MS lifetime + WD cooling + cristalisation slows down cooling process.
- Cut-off at high M_G provide a low limit for age of the disc.
- WDs are very faint + disc height --> Density declines beyond 40 pc.
- We consider BC=f(G-G_{RP}) taken from DA WDs (Bergeron+2019): No DB or logg effects considered.