

# Luminosity function of white dwarfs and discovery of new white dwarfs by means of Gaia EDR3 data



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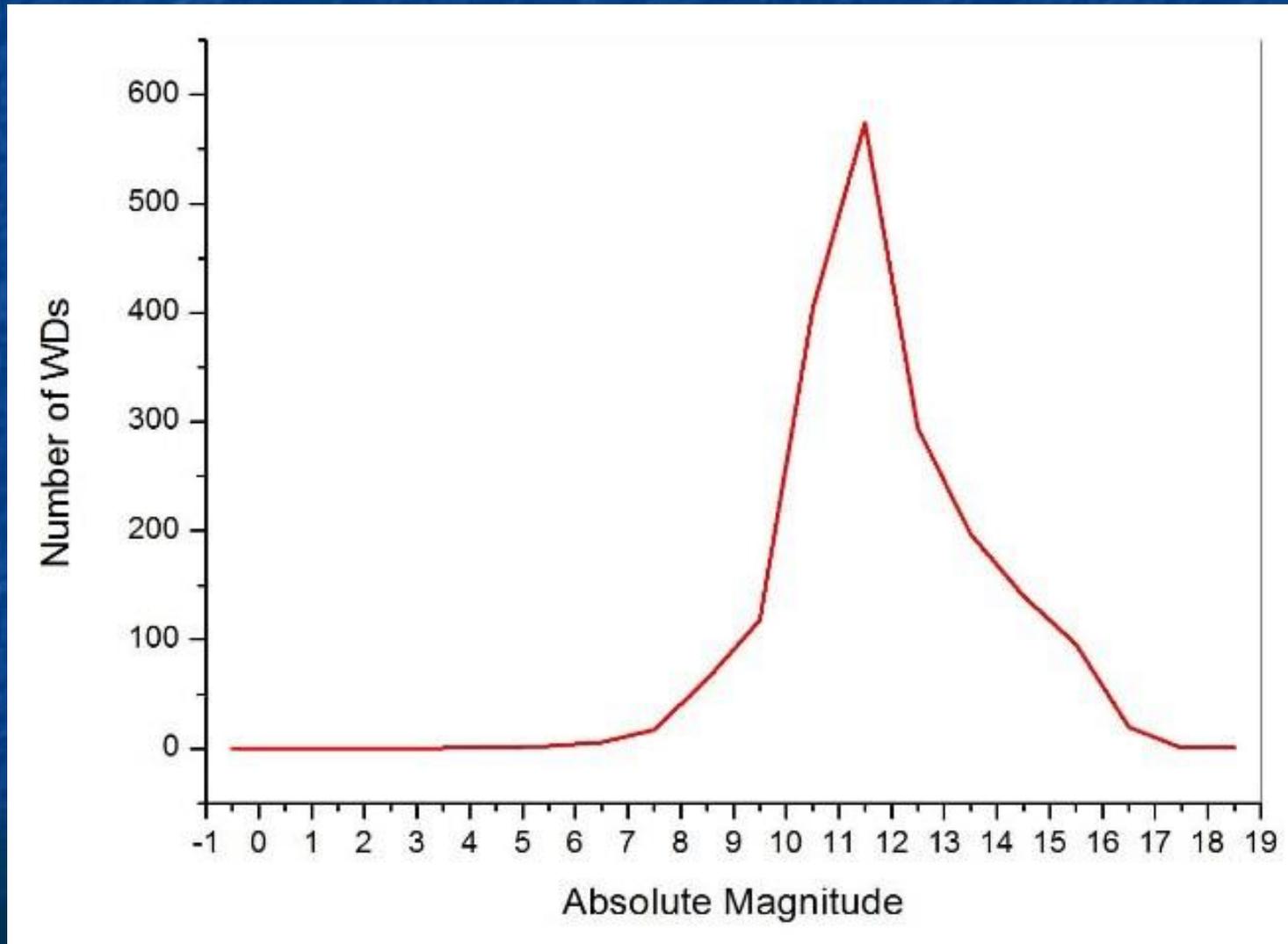
# Outline

- Statistical study of white dwarfs' (WDs) properties carried out based on the sample of the FBS BSOs and the Catalogue of White Dwarfs
- Search for new white dwarfs by means of Gaia accurate astrometry
- Average physical properties of WDs
- Using Gaia accurate data in combination with SDSS and DFBS low-dispersion spectra and additional MW data
- Binarity and variability (e.g. ZZ Ceti stars (pulsating WDs), cataclysmic variables, etc.)
- WDs among FBS blue stellar objects and in DFBS at high galactic latitudes have been searched and revealed

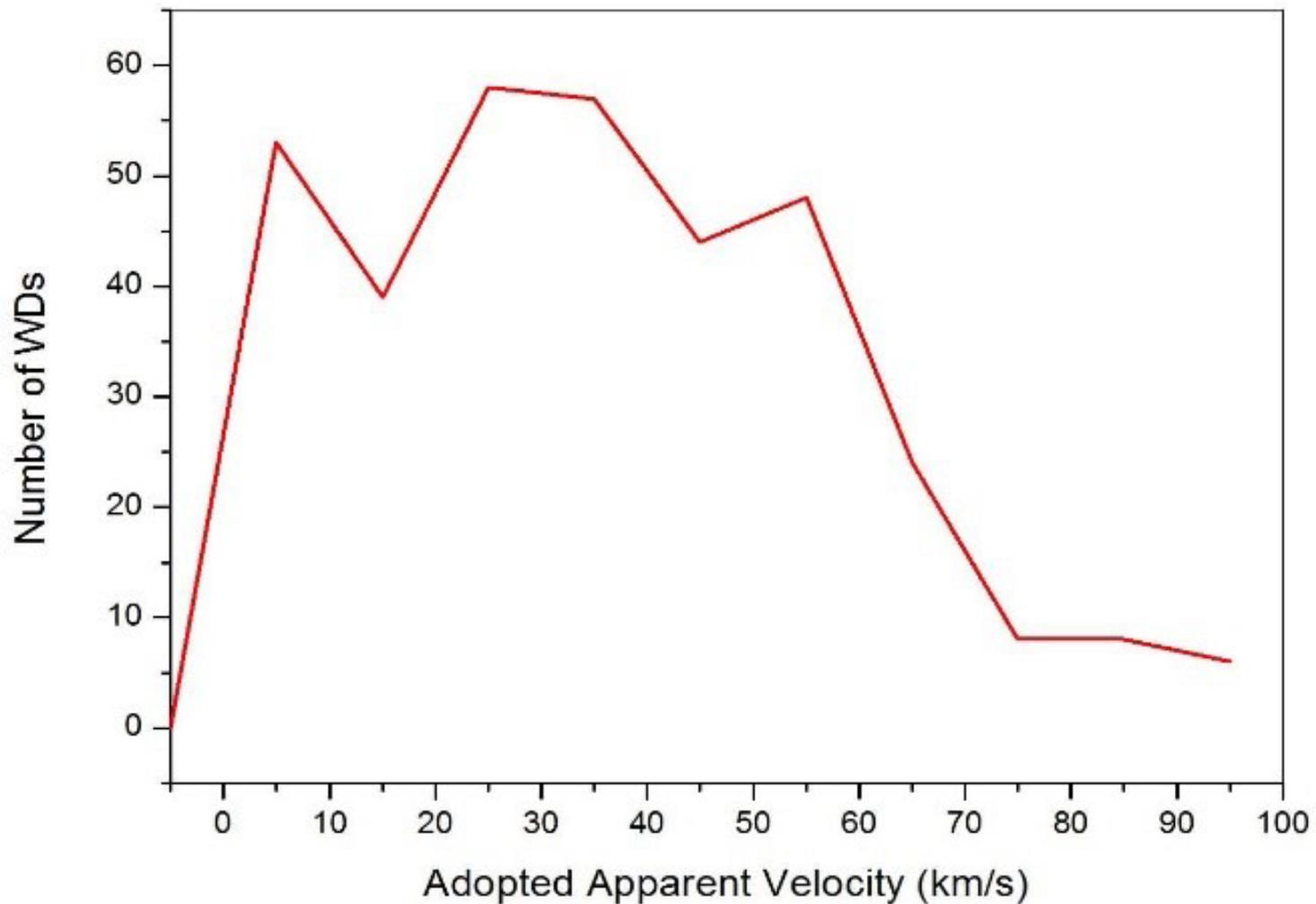
# Statistical Analysis of MS-2016 White Dwarf Catalogue

- Total number of WDs: 14,294. Among them there are:
- 368 WDs having parallaxes, in the range 0.0001-0.575, the average is 0.046
- 10,871 WDs having total proper motion (PM) in the range of 0.0010-4.0800 arcsec/year
- only 345 have adopted apparent velocities (Adp-V) in the range of 0.058-97.190 km/s, among them 328 (95.1%) have velocities less than 75 km/s
- 1937 WDs have absolute magnitudes in the range of  $-0.11$ ...  $18.10$ ; we consider as the limit for WD  $7.5^m$
- 1919 WDs (out of 1937, 99.1%) are fainter than  $7.5^m$

# Statistical Analysis of White Dwarf Catalogue



# Statistical Analysis of White Dwarf Catalogue



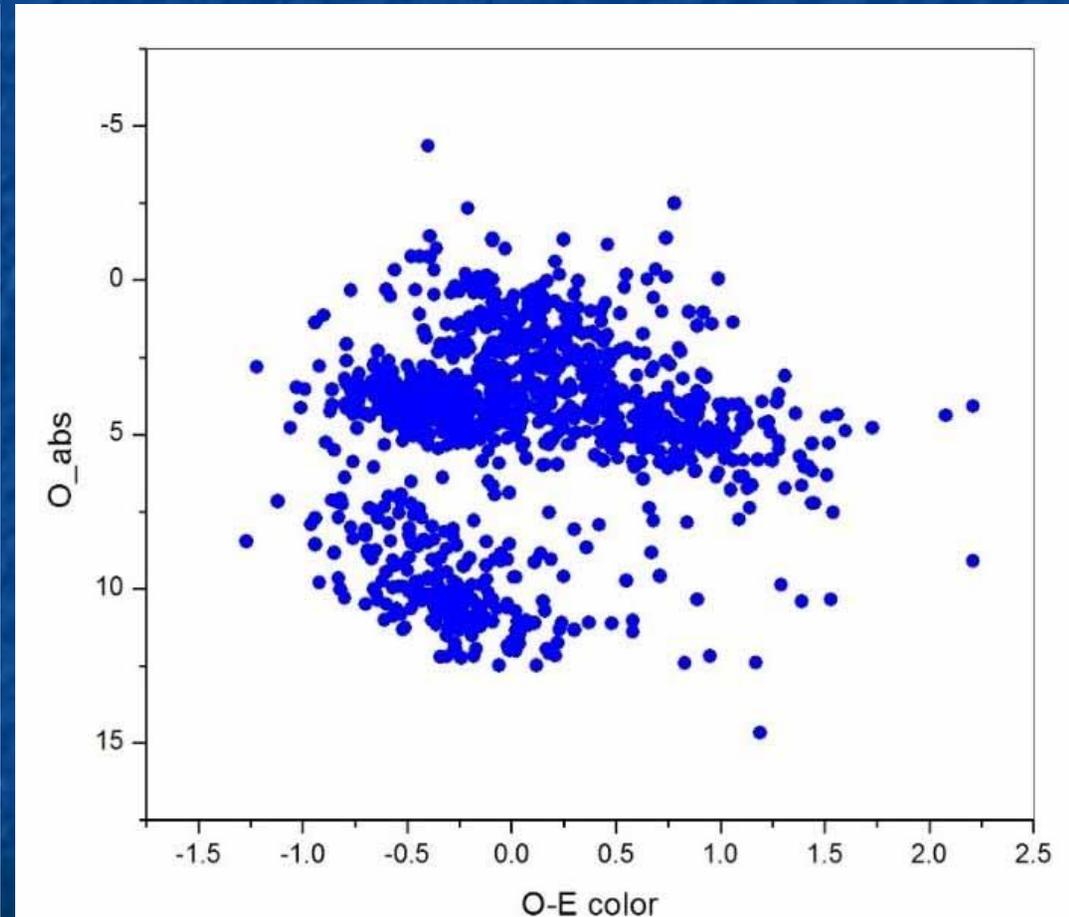
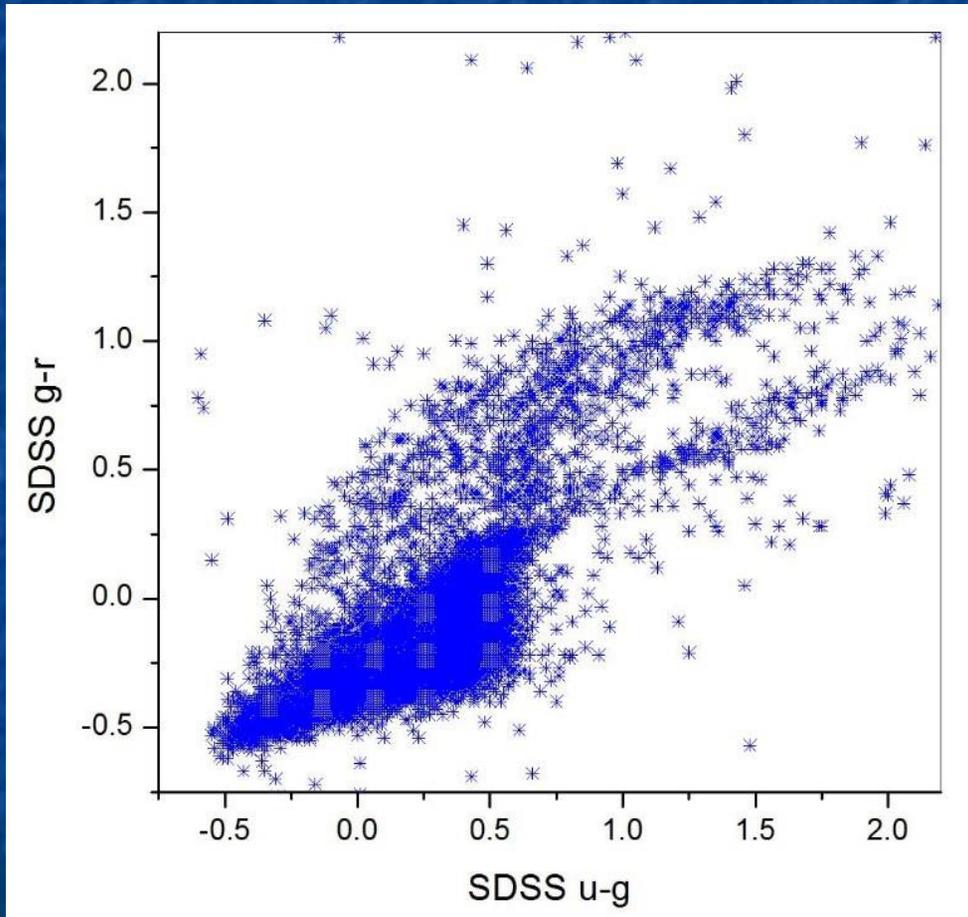
# Gaia EDR3, SDSS DR16 and Gaia Distances

- Gaia EDR3 (Brown et al. 2021) for parallaxes, PM, distances and Teff
- SDSS DR16 (Ahumada et al. 2020) for photometry (magnitudes and colors) and spectra
- Gaia EDR3 catalogue (Bailer-Jones et al. 2021) for distances

*The numbers of matches:*

- Gaia EDR3: **4338** matches,
- Gaia distances: **4233** matches,
- SDSS DR16: **4468** matches.

# Gaia EDR3 data and SDSS photometry and spectra



SDSS color-color and MAPS color-magnitude diagrams

# FBS Blue Stellar Objects: their proper motions and white dwarfs

First Byurakan Survey (FBS) 1103 objects:

- Gaia EDR3: 1032 matches,
- Gaia distances: 1028 matches,
- SDSS DR16: 631 matches.
  
- Digitized FBS (DFBS): many more faint objects:
- revealing thousands of new spectroscopically identified WDs at high Galactic latitudes from SDSS, based on their proper motions and spectroscopy
- revealing thousands of new high Galactic latitude WD candidates in the DFBS using both DFBS and Gaia low-dispersion spectra, when available