eROSITA view of Be stars

Y. Nazé (ULiège/FNRS) & J. Robrade (Hamburg Obs.)

Be stars and X-rays

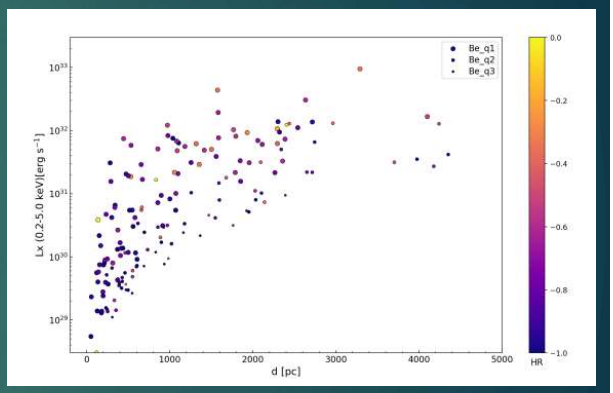
- Fast-rotating stars with Balmer emission → *decretion* disk
- Properties (rotation, mass) from start, @formation, or after binary interactions (i.e. Be=initially least massive component now most massive component) ; if binary channel: companion is a stripped He-star or a compact object (WD, NS, BH)
- In X-rays :
  - ❖ HMXBs associated with Be stars ∃
  - ❖ Candidate WD+Be objects spotted in MCs from supersoft X-rays
  - ❖ Candidate BH+Be objects proposed then rejected from optical data (they were X-ray faint)
  - ❖ γ Cas have bright and hard X-rays – companions have low masses but unknown nature
  - ❖ First Be survey done using archival/serendipitous exposures *(Nazé & Motch 2018, A&A, 619, A148)*
    → potential biases exist!

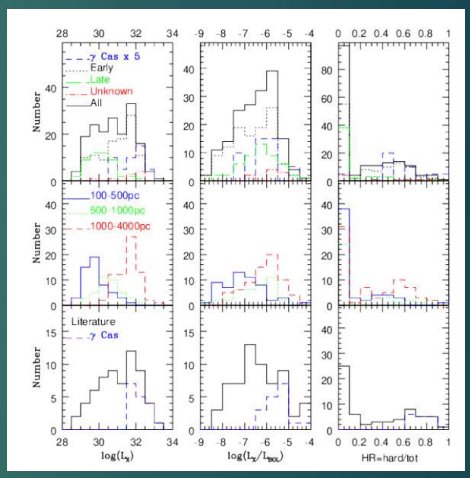
A clean sample

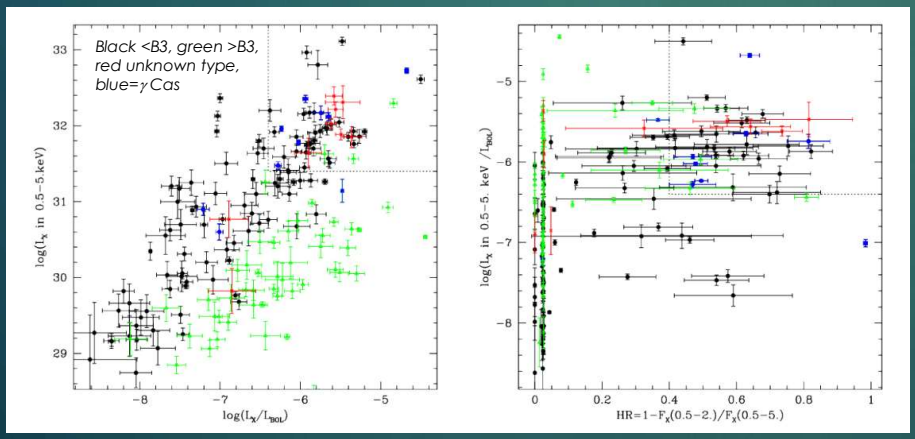
- BeSS catalogue:
  - ❖ limited to MW
  - ❖ without known HMXBs, YSOs, non-classical Be stars, other massive objects (WR, LBV)
  - ❖ Secure GAIA-DR3 or Hipparcos distances (RUWE<1.4, R_{plx}>5)
- eROSITA all-sky survey (eRASS) data:
  - ❖ Four all-sky scans over 2 years, 0.2-10 keV range (used individually or combined)
  - ❖ Detection likelihood at least 6
  - ❖ Optical contamination estimated for bright sources and corrected

More on eROSITA? Predehl et al. 2021 (A&A, 674, A1)

⇒ 832 Be stars in eROSITA_DE half sky,
170 detections (twice the # of previous survey!)







Properties of detected objects

/!\ fluxes corrected for interstellar reddenings only

- Good agreement with properties from literature (23 cases), considering different bands (0.5-10 keV before vs 0.5-5 keV)
- Distant sources are brighter and harder

- Most detections have HR=1-F_X(0.5-2)/F_X(0.5-5) < 0.1
  - ❖ No bright supersoft sources
  - ❖ 34 sources bright and hard, nearly all with early spectral types (7 are γ Cas, 2-4 possibly low-luminosity XRBs)

Reference : Nazé & Robrade, in prep.

Contact : ynaze@uliege.be