At what temperature does magnetic dynamo action cease?
or
How hot is the hottest cool star?

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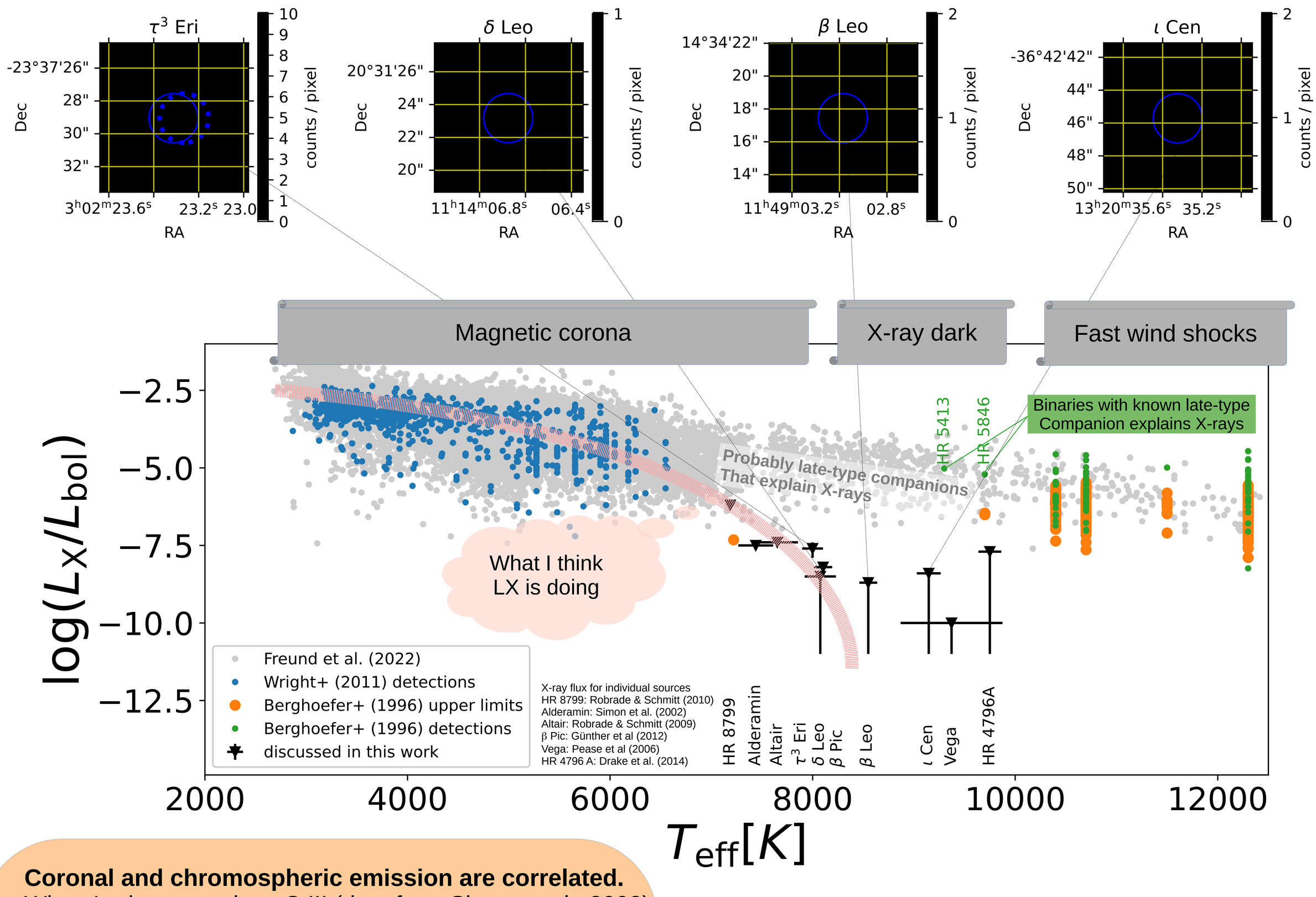
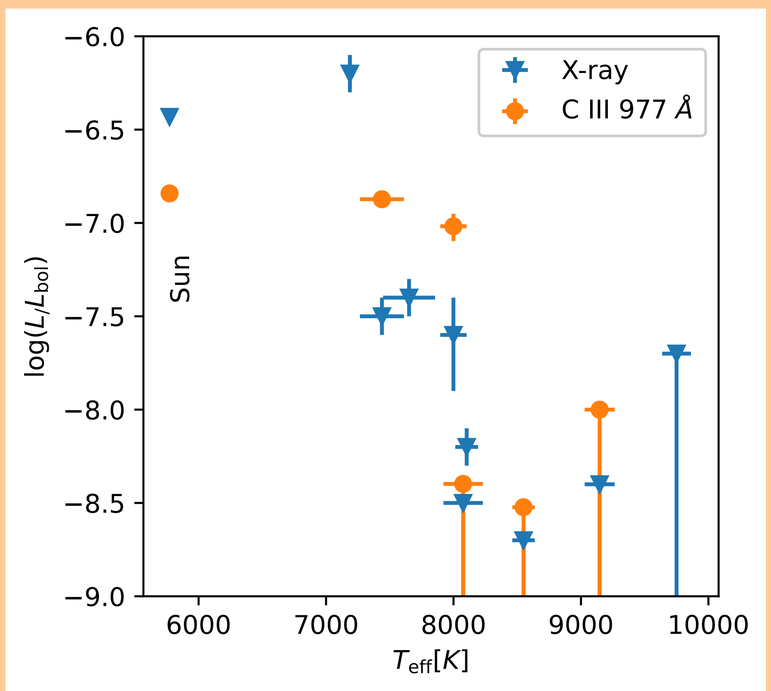
Cool stars on the main sequence generate X-rays from coronal activity, powered by a convective dynamo. With increasing temperature, the convective envelope becomes smaller and X-ray emission fainter, so some cool star must be the “hottest cool star” before emission ends. We present Chandra/HRC-I observations of four single stars with early A spectral types. Only the coolest star of this sample, τ^3 Eri (T_{eff} = 8000 K), is detected with $\log(L_X/L_{bol})$=-7.6, while the three hotter stars (T_{eff} > 8100 K), namely δ Leo, β Leo, and ι Cen, remain undetected with upper limits $\log(L_X/L_{bol})$<-8.4. The drop in X-ray emission thus occurs a in narrow range of effective temperatures around 8100 K and matches the end of activity in the C III and O VI transition region lines. Based on our observations, τ^3 Eri might well be the hottest star that still shows cool-star like coronal activity.



Coronal and chromospheric emission are correlated.
When L_x drops, so does C III (data from Simon et al., 2002)



Note
Fast rotating stars have temperature difference between equator and pole, essentially:
Different spectral type (e.g. Monnier et al. 2007 for Altair)

Not important for coronal emission:
- planets
- rotation rate
- debris disk

Important: Temperature < 8100 K

https://ui.adsabs.harvard.edu/abs/2022arXiv220505815G