X-RAY EMISSION OF INTERMEDIATE-MASS T TAURI STARS

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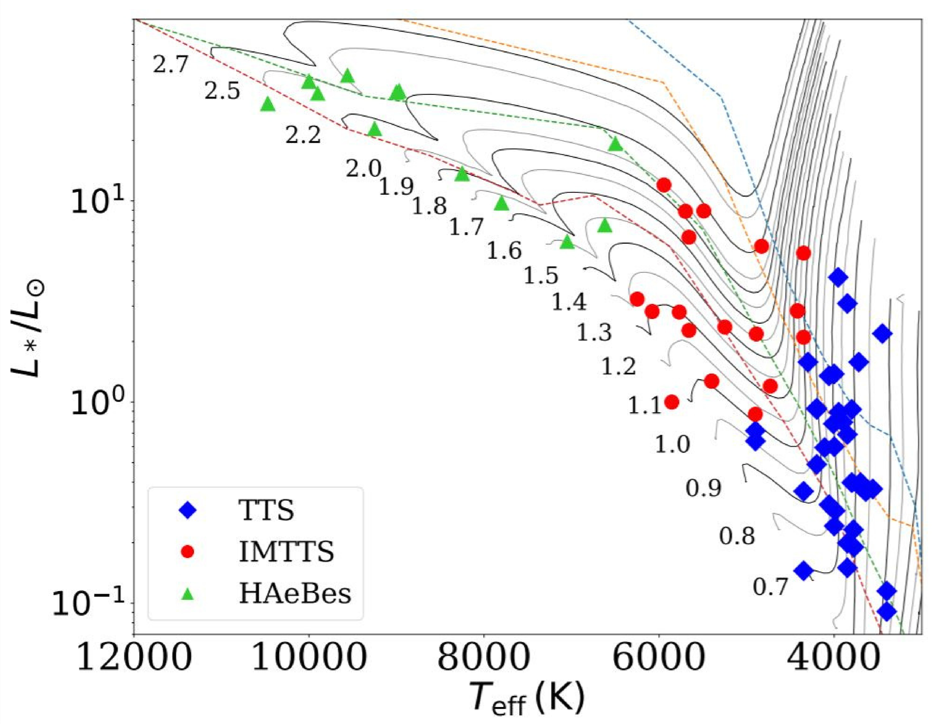
What are IMTTS?

Intermediate-mass T Tauri stars (IMTTS) are pre-main sequence (PMS) stars surrounded by protoplanetary disks. They are more massive than the solar-mass T Tauri stars (TTS), and younger than the intermediate-mass Herbig Ae/Be stars (HAEBEs).



Why are they interesting?

In stars, convection + rotation can generate a magnetic dynamo.

Most PMS stars start out fully convective, but while the low-mass TTS take a long time to develop a radiative core (some even never do), HAEBEs do so rather fast.

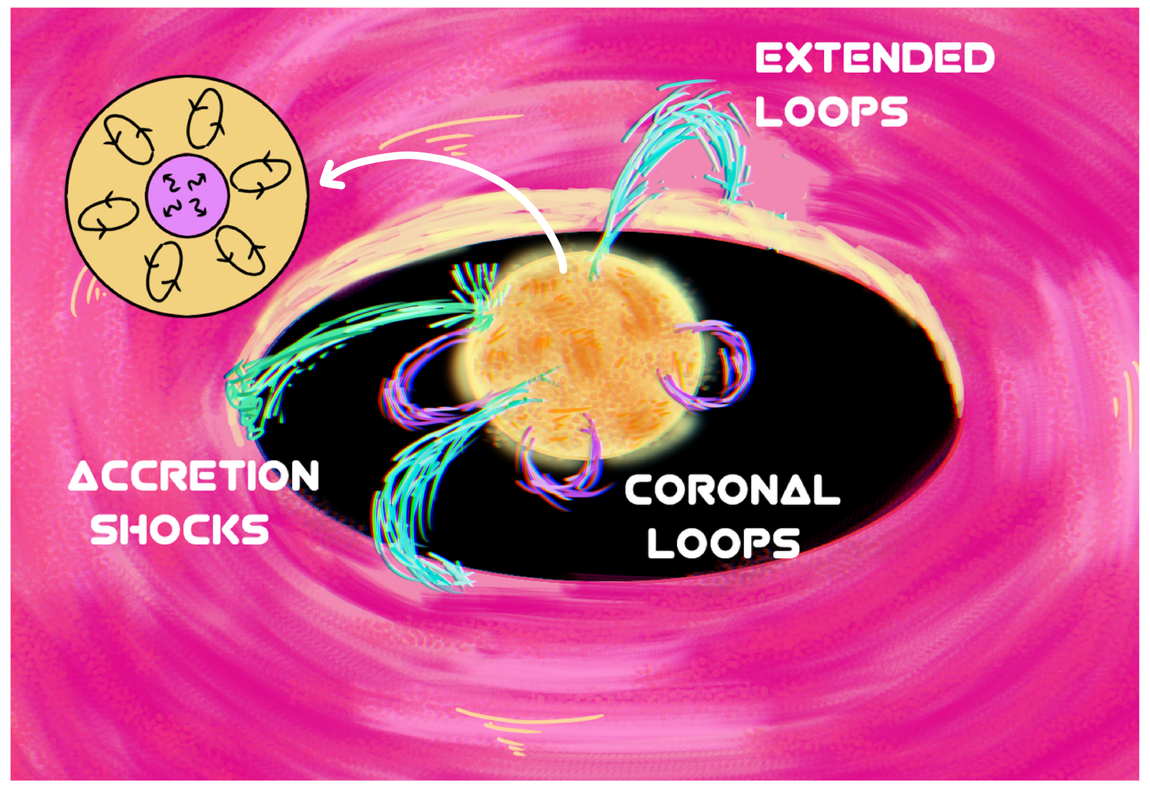
Although HAEBEs are expected to lack the magnetic fields necessary to have coronal X-ray emission, they have been detected in X-rays. The reason for this is still debated, which is why we want to study their precursors, the IMTTS. Possible scenarios include a hidden T Tauri companion or remnant magnetic fields.

Aim of the study

To study the X-ray properties of IMTTS to shed light onto the magnetic evolution of intermediate PMS stars.

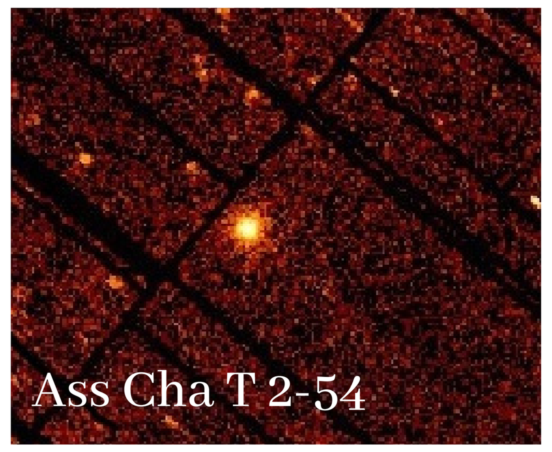
How do we do this?

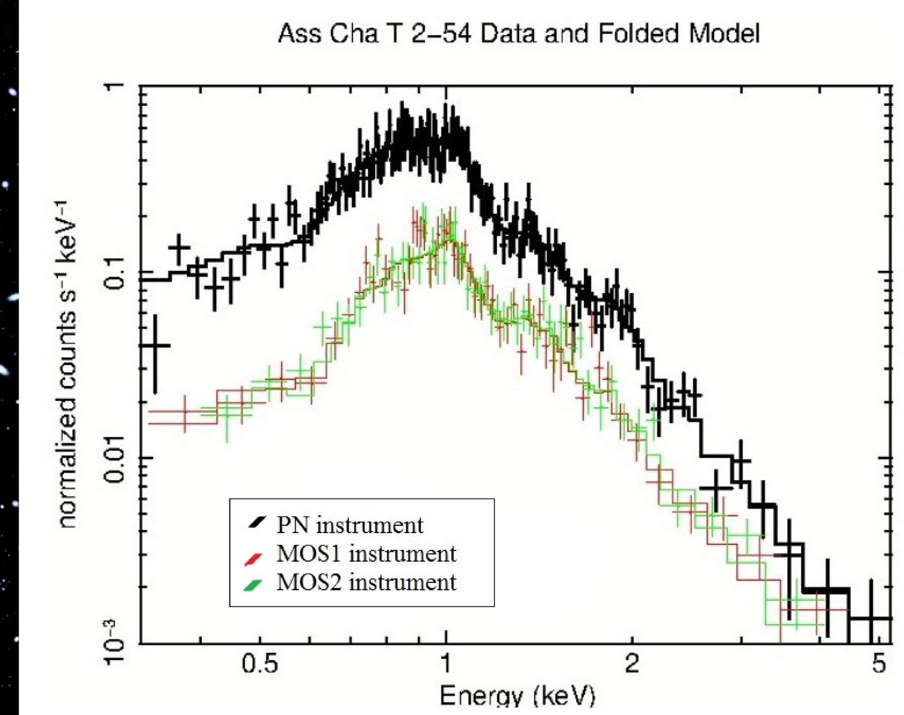
- We compiled a sample of 60+ IMTTS
- We searched for archival data and obtained new observations with XMM
- We are currently analyzing the new X-ray data
- We will relate the X-ray properties with stellar and disc properties, such as radiative core radius and accretion.
- Finally, we will compare the results with those of HAEBEs and T Tauri stars



Preliminary results

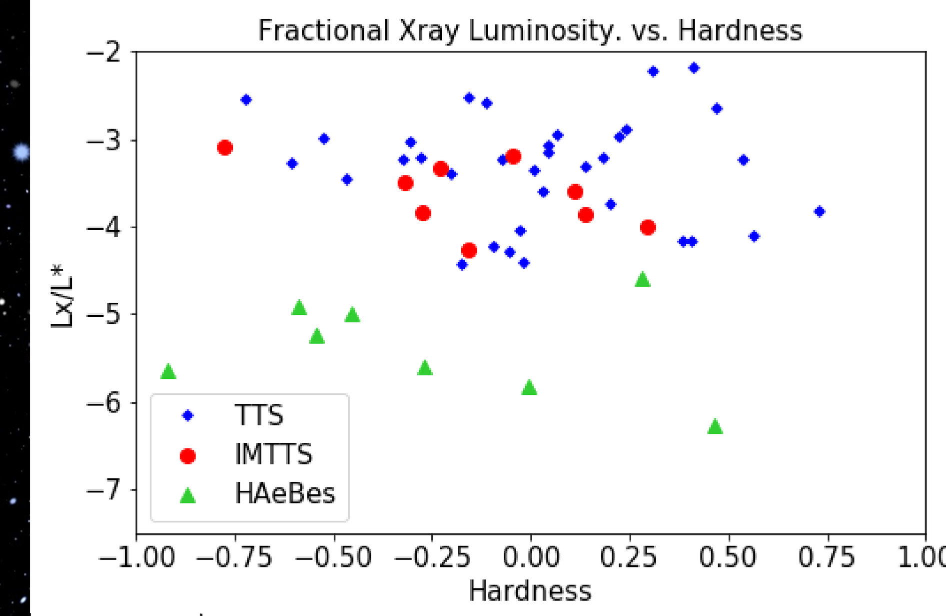
We obtained observations for 9 IMTTS that had not yet been observed in X-rays. Most objects emit strongly in X-rays.





X-ray spectra of IMMTS are well described with two-component APEC models, as is also observed in many TTS and HAEBEs.

While the hardness ratio has a similar range, the fractional X-ray luminosity in HAEBEs is lower than that of IMTTS and TTS. This might be related to the later development of a radiative core.



Next steps

More detailed analysis for the spectra, also those from the archive.

I am looking for a PhD position! If you want to talk to me, you can contact me at madiazteo@gmail.com