

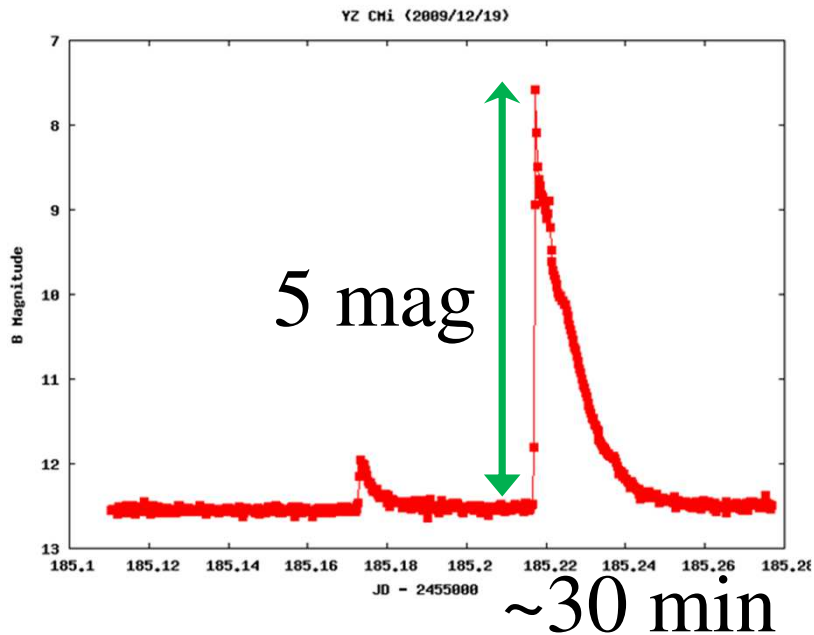
Proposals of photometric
observations of star clusters for
stellar activity research and a
high dispersion spectrograph

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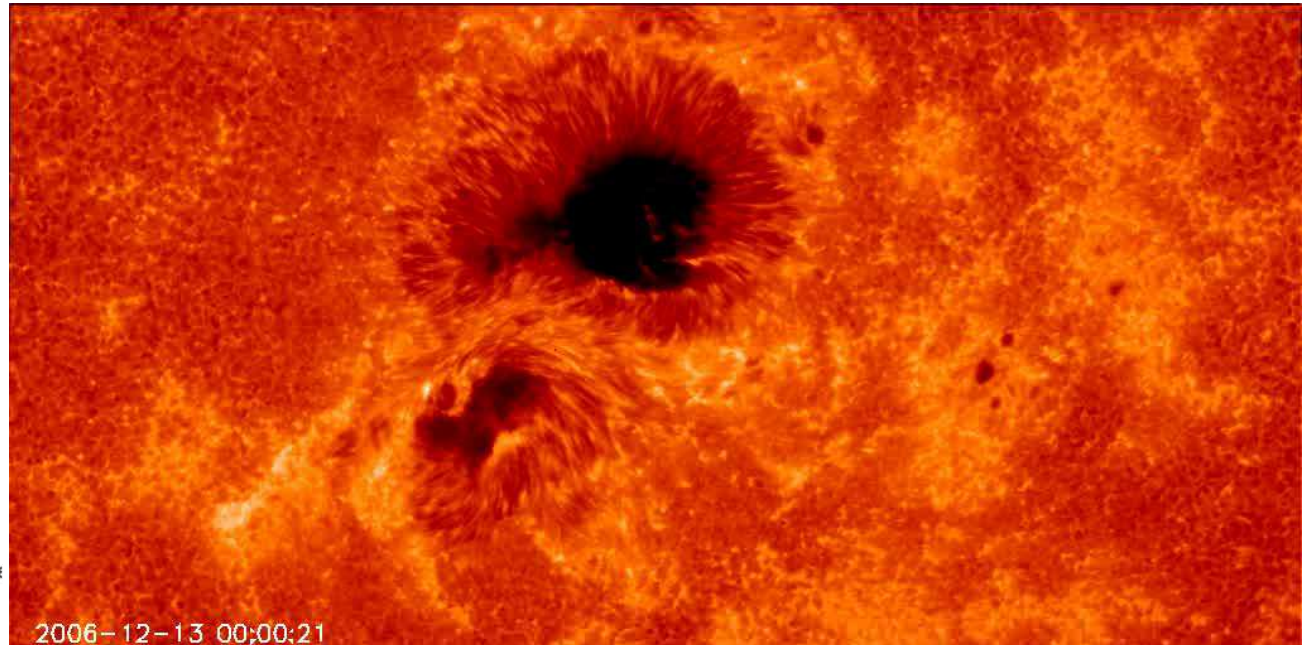
I. Solar/stellar flares

- Flare: explosion on the solar/stellar surface utilizing the magnetic energy stored around spots

Large flare in YZ CMi



A solar flare observed in Ca II K by Hinode



- Dynamo mechanism: rapider rotation → stronger magnetic fields(e.g. Reiners et al. 2022)
- Stars get older with the rotation slower due to loss of AM by stellar winds.
- Then, are younger stars magnetically more active than older stars?
 - Basically yes, but not so clear observationally.

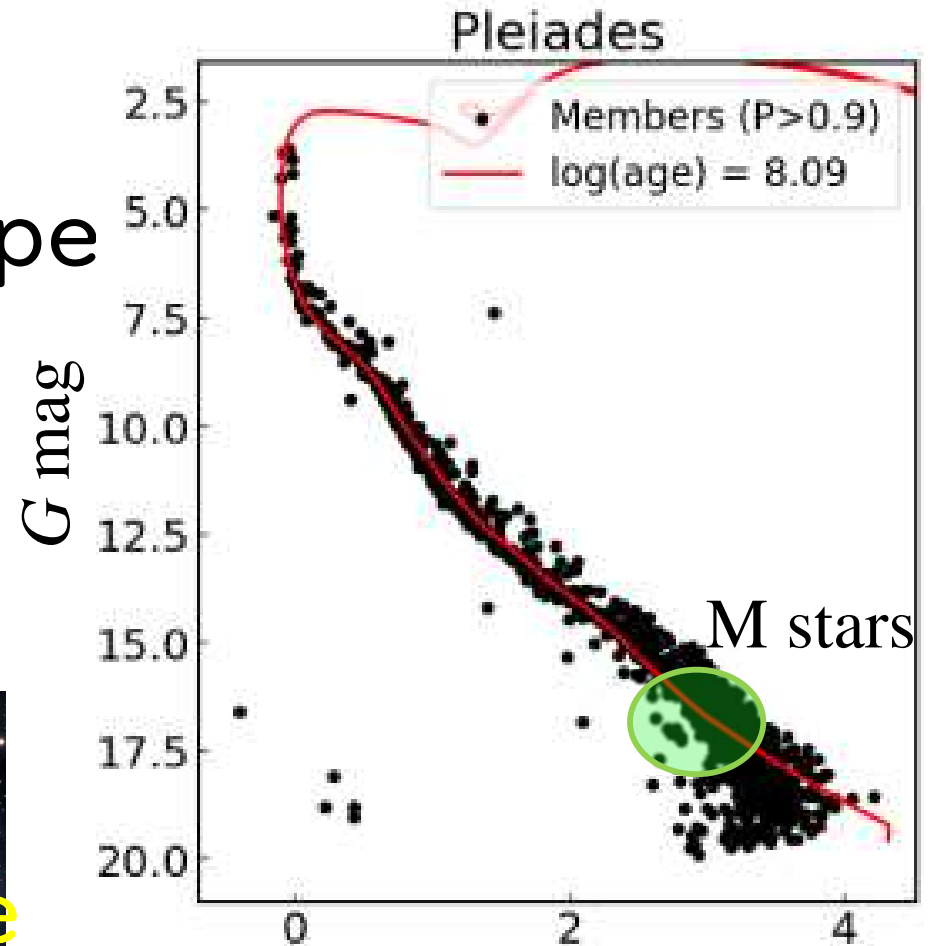
We need to know **the magnetic activity of many stars with known age.**

→ Flare statistics of late-type stars in open clusters

2. Flare statistics

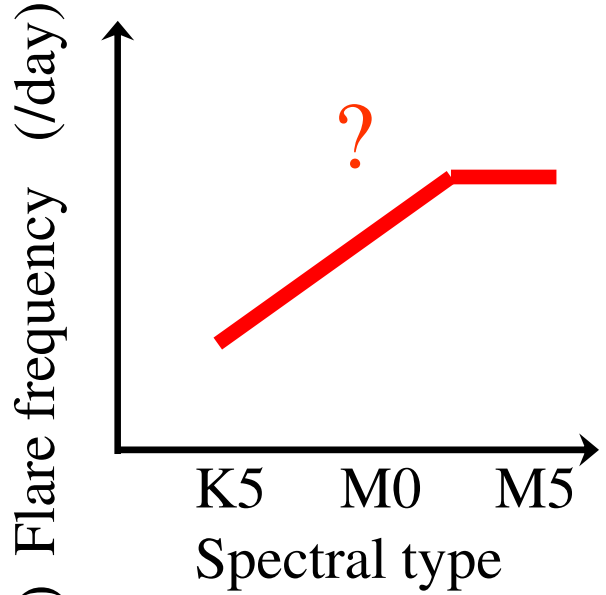
- There are many open clusters having M-type stars brighter than 20 mag.
- Long-time obs. will

detect many flares
on many (GM)M-type
stars.

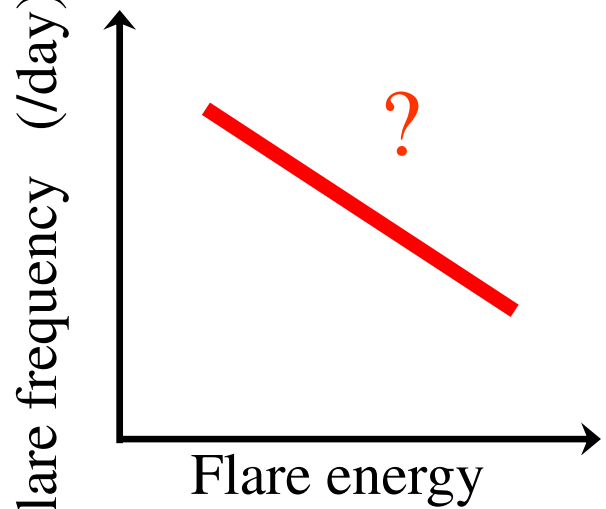


GBP - GRP
Liu et al. (2023)

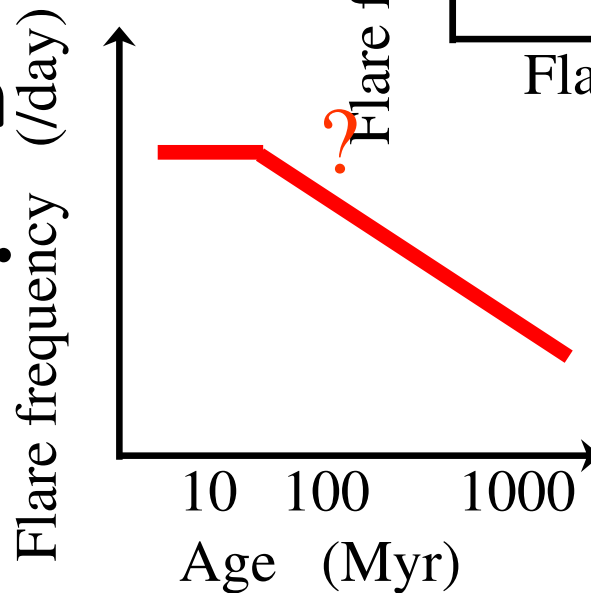
- Statistical analyses
 - Flare frequency vs flare energy
 - Flare frequency vs spectral type
 - Flare frequency vs age
 - ...



- These will give new basic info. on the inner stellar structure and stellar evolution.



- We will do this research with Zamzam by Seimei. Please join this project from Timau!



3. High Dispersion Spectrograph

- Needed for measurement of the basic stellar properties, such as spec. type, v_{rot} , chemical abundances, ...
- Also for the stellar activity (spots, plages, ...), exoplanet search, atmosphere of exoplanets, ...
- A high spectral resolution ($\lambda / \Delta \lambda \sim 100,000$) and high throughput are desirable.