Contribution ID : **45** Type : **Contributed talk**

Freckled and Flaring: Statistical Starspot Mapping on M Dwarfs via Stellar Flares

Wednesday, 28 October 2026 13:25 (10)

The spatial distribution of starspots on red dwarf stars remains an open question in stellar astrophysics. Understanding whether red dwarfs' starspots are preferentially equatorial—akin to the Sun—or are preferentially polar can give us insight into how these generate their magnetic dynamos and help to better characterize the atmospheres of the planets that orbit them as atmospheric observations are heavily contaminated by starspots. Most tested surface mapping techniques are either observationally expensive or highly degenerate, making it difficult to obtain a population-level understanding of starspot distributions. Fortunately, stellar flares, which result from magnetic reconnection events that are spatially correlated with starspot locations on the Sun, make flare observations a powerful diagnostic of starspots on distant stars. I have developed and rigorously tested a framework to detect stellar rotation and energetic flares in light curves from NASA's Transiting Exoplanet Survey Satellite, which I am using to correlate flare times with stellar rotational phase as a proxy for the distribution of starspots. My early analysis of over 6,500 red dwarfs suggests that, regardless of the interior stellar dynamo, these stars are dominated by equatorial starspots.

Did you give a contributed talk at CASCA 2026?

No

If you are selected for a poster, would you be interested in giving a short flash talk on your work?

Yes

What is your career level?

MSc

Which keyword describes the area of focus of this talk?

Stars & stellar clusters

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