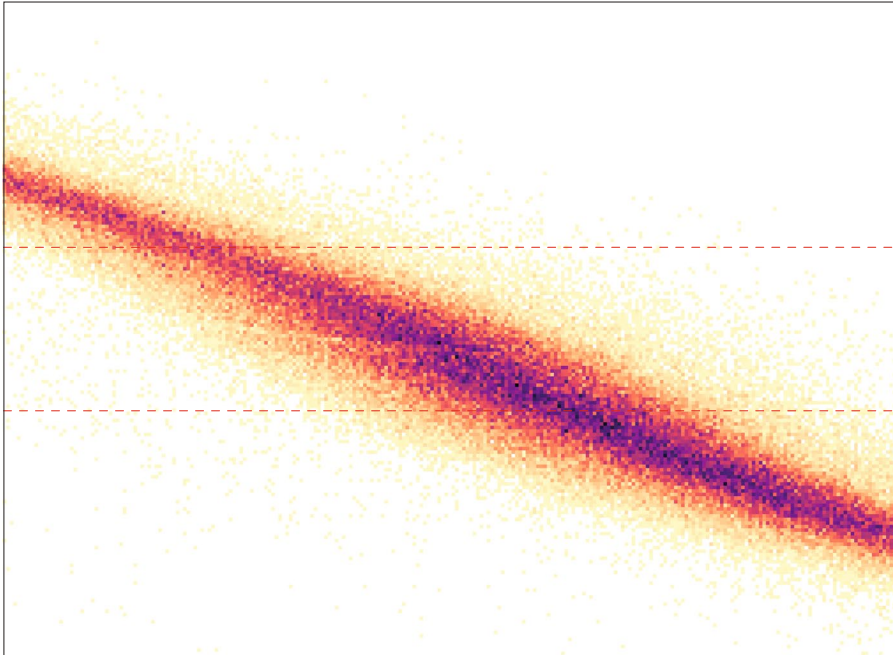


STARS

Surprise from Gaia*Astrophys. J. Lett.* **861**, L11 (2018)

Credit: courtesy of Wei-Chun Jao, Georgia State University

The Hertzsprung–Russell (HR) diagram that plots the colour of stars as a function of their absolute magnitude is arguably one of the most famous features in astronomy as it handily summarizes our knowledge of stellar evolution. Wei-Chun Jao and colleagues show that even such established and well-known features can still harbour the unexpected.

Jao et al. make full use of the extreme precision of Gaia Data Release 2 astrometric measurements to focus on close-by red dwarfs within a 100 pc distance, a total of ~700,000 stars. They are able to identify a very narrow but clear gap cutting across the red dwarfs section of the HR diagram (pictured), revealing a relative dearth of stars at approximately magnitude 10 (with a slight dependence on stellar temperature).

After verifying that it is not an effect related to biases in the Gaia sample or to the Gaia photometry, Jao et al. try to determine the physical meaning of this feature.

They propose that the gap is connected to internal stellar convection: the stars above it may still retain a thin radiative layer and are more massive, whereas the ones below the gap are less massive and fully convective. The presence of the gap indicates that the transition between the two regimes is abrupt and not a continuum. Jao et al. suggest various tests that can be done in the future to confirm this interpretation.

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Published online: 20 July 2018
<https://doi.org/10.1038/s41550-018-0555-4>