SuperWASP and VeSPA
Giving results back to citizen scientists

We're classifying variable star light curves using the Zooniverse

Results are soon to be published on superwasp.org in a way that will be accessible to citizen scientists

Over 190,000 candidate stars

Over 2.3 million classifications

Over 9,500 citizen scientists

Adam McMaster, Andrew Norton, Hugh Dickinson, Heidi Thiemann, Ulrich Kolb
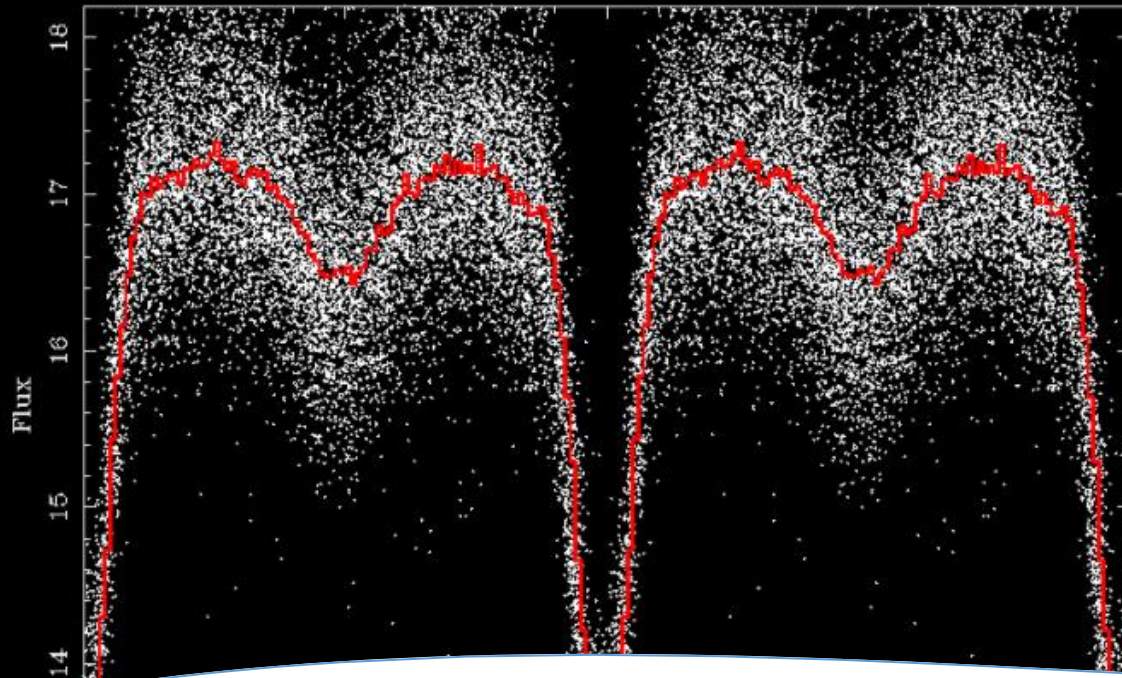School of Physical Sciences, The Open University
adam.mcmaster@open.ac.uk
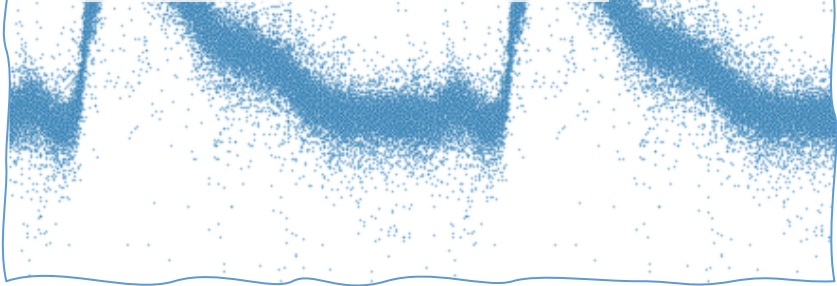
@SuperWASP_stars   @AstroAdamMc

SuperWASP Variable Stars on the Zooniverse

Volunteers are presented with a plot of the source's brightness. This plot was produced by taking several years' worth of observations and folding them at a candidate time period. This makes obvious any periodic variations in the source's brightness. The red line shows the bin-wise mean. Based on the shape of the curve the volunteers choose a variable star type: pulsator; EA/EB type (detached eclipsing); EW type (contact eclipsing); rotator. They can also choose "unknown" for anything that looks periodic but doesn't fit any category, or "junk" for spurious plots/noise. Classifications from multiple people are combined to produce a consensus classification for each source.

zooniverse.org/projects/ajnorton/superwasp-variable-stars
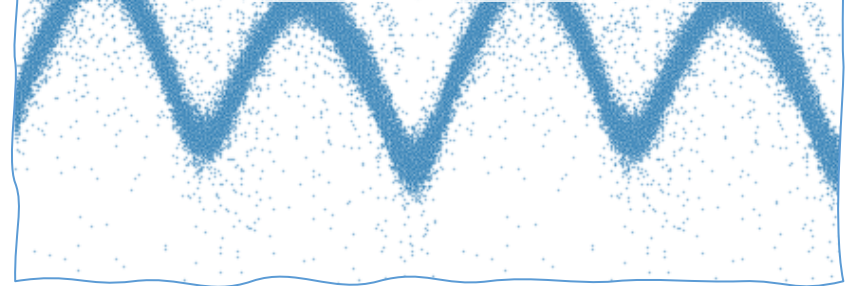
Types of Variable Star in SuperWASP

Pulsators

The star is physically pulsating because it is unstable, undergoing thermally-driven expansion and contraction. Magnitude increases and decreases with each pulsation.
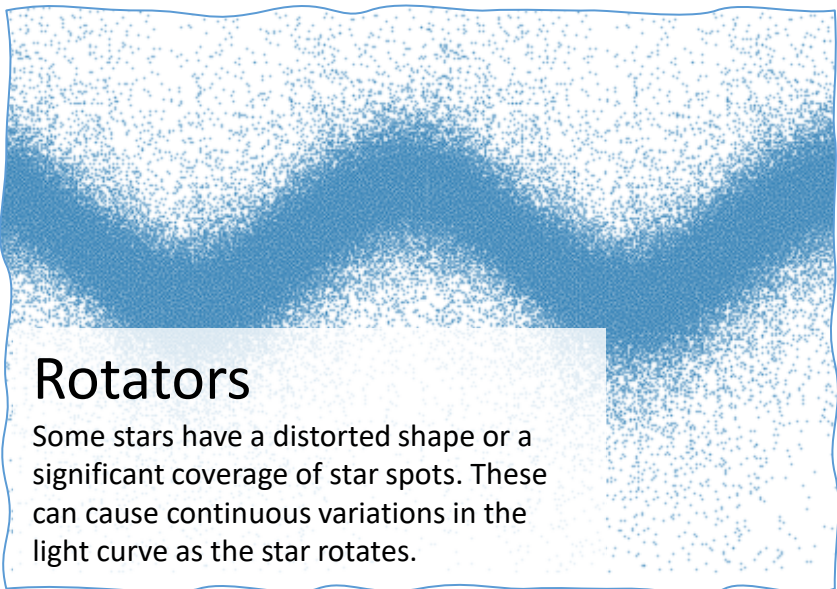
Contact Eclipsing

Two stars orbit each other so closely that they're touching. They happen to be lined up so that they eclipse each other. We see an alternating pattern of peaks and dips in the light curve.
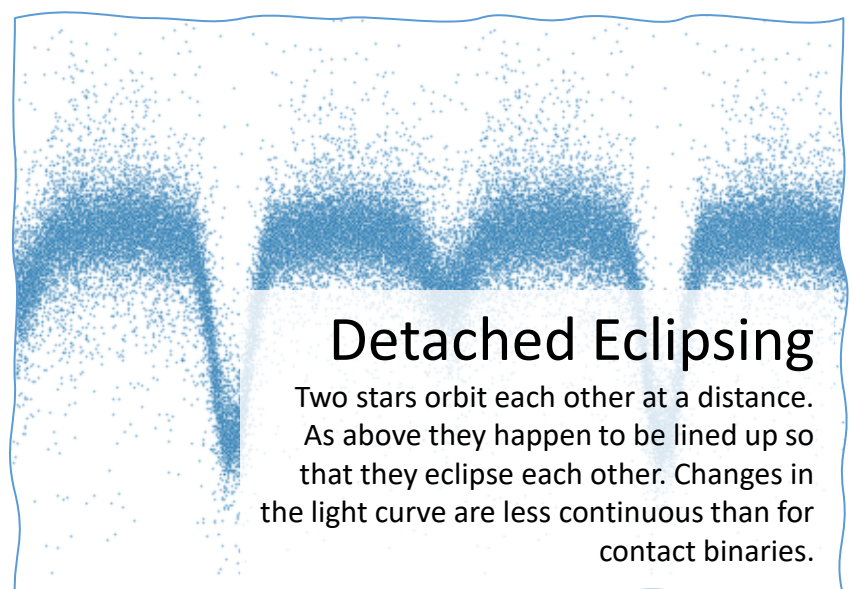
Rotators

Some stars have a distorted shape or a significant coverage of star spots. These can cause continuous variations in the light curve as the star rotates.

Detached Eclipsing

Two stars orbit each other at a distance. As above they happen to be lined up so that they eclipse each other. Changes in the light curve are less continuous than for contact binaries.

VeSPA: The Variable Star Photometry Archive

The first data release comprises consensus classifications of 190,063 light curves: 25,730 pulsators; 56,582 rotators; 36,382 contact eclipsing binaries; 29,882 detached eclipsing binaries; and, 41,541 unknown sources which seem to have periodic variations. The archive can be searched by coordinates or by common object name, making it easier for the public to use as well as professional astronomers.

The archive currently includes results from over 1 million individual classifications from 4,500 volunteers of over 500,000 sources. This represents about a third of the total catalogue. We intend to keep the archive updated with new results and refined classifications, with results from another million classifications coming soon after launch.

To read more about our results see Thiemann+ 2021 (doi.org/10.1093/mnras/stab140).

Available soon at superwasp.org