

Cool stars research at the University of Southern Queensland

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Overview

Cool stars research is central to our studies of the shared evolution of stars and their planetary systems. These studies are based on international and Australian collaborations and access to observatory facilities including Siding Spring Observatory and Mt Kent Observatory in Australia. Four interrelated themes are shown below.

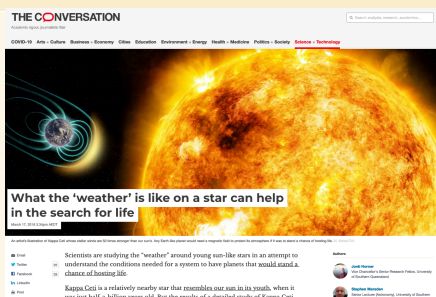
Stellar physics, magnetic activity and winds

Key projects:

BCool observations of cool star magnetic fields
GALAH galactic archaeology with HERMES
SONG asteroseismology
Modelling the winds of solar-type stars

A stellar-exoplanet connection.

See Horner & Marsden
theconversation.com



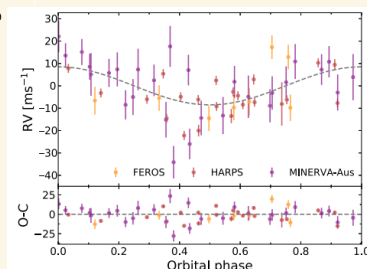
Exoplanet discovery and characterisation

Key projects:

MINERVA-Australis *TESS* follow-up spectroscopy
Shared Skies Partnership *TESS* follow-up photometry
"Know the star, know the planet" - characterising stars to characterise their planets

Radial velocity signature of a warm sub-Saturn planet TOI-257b.

See Addison et al.
<https://arxiv.org/abs/2001.07345>



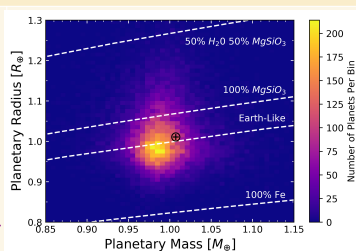
Planetary systems modelling

Key projects:

Modelling orbital dynamics
Comparative exoplanetology
Formation and evolution of the Solar system
Astrobiology - planetary climate and impact rates

Simulated effects of composition on the observed mass and radius for an Earth-like planet.

See Clark et. al.
<https://arxiv.org/pdf/2008.05372.pdf>



Astronomical facilities and instrumentation

Key projects:

Mt Kent Observatory 5 x 0.7m, 2 x 0.6m telescopes
Veloce spectrograph 3.9m Anglo-Australian Telescope
Veloce+RAPTOR, Veloce auxiliary telescope fibre feed
Global Fireball Observatory cameras, Queensland
Twinkle Space Mission survey (2024-)

Remote-access "Shared Skies" telescope, Mt Kent.

See sharedskies.org

