



The Shared Evolution of Stars and their Planetary Systems

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Overview

Our research aims to advance understanding of the shared evolution of stars and their planetary systems via a range of complementary studies and collaborations. Current projects include stellar magnetic field mapping and wind modeling, exoplanet detection and characterization, and dynamical modeling of solar system bodies and exoplanetary systems. Our research uses existing and new facilities, including USQ's Mt Kent Observatory, its new MINERVA-Australis telescope array for NASA TESS follow-up, the new Veloce precision radial velocity spectrograph on the 3.9m Anglo-Australian Telescope at Siding Spring, and a forthcoming SONG asteroseismology node at Mt Kent.

Stellar astronomy projects

BCool – Detection and mapping of the magnetic fields of cool stars
BinaMiCS – Binarity and Magnetic Interaction in various classes of Stars
BRITepol – BRITe Target Explorer polarisation survey of bright stars
FunnelWeb Survey – A major new spectroscopic survey of southern-sky stars
HATSouth – Hungarian-made Automated Telescope Network-South transit survey
MaTYSSE – Magnetic Topologies of Young Stars & Survival of massive close-in Exoplanets
SONG – Stellar Observations Network Group asteroseismology and exoplanet studies
Spitzer – Light Curves of Young M Dwarfs Rotating Near Breakup
Starwinds – Stellar wind models based on stellar magnetic field observations
TESS – Follow-up Observing Program subgroups SG1 photometry, SG2 radial velocities
TOUPIES – Towards Understanding the sPIn Evolution of Stars

Planetary systems projects

AAPS – Anglo-Australian Planet Search with Anglo-Australian Telescope at Siding Spring
AST3 – Antarctic Survey Telescopes used for wide-field exoplanet transit search studies
KELT-South – Kilodegree Extremely Little Telescope South exoplanet transit survey
Kepler – This space telescope's data archive is analysed for stellar and [exoplanet studies](#)
DFN – Desert Fireball Network cameras used for locating recent meteorite falls
Veloce – A precision spectrograph for the Anglo-Australian Telescope
MINERVA-Australis – Mt Kent Observatory's new facility for exoplanet studies

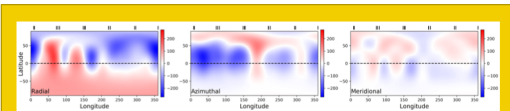
Mt Kent Observatory

This dark-sky site is about 20 km southwest of Toowoomba in southern Queensland, Australia (28S, 153E). The site hosts a PlaneWave Instruments CDK20 telescope, a CDK700, telescope, and a wide-field Takahashi camera all provided by the Shared Skies Partnership with the University of Louisville: <http://www.sharedskies.org/> The site is now being upgraded to accommodate the MINERVA-Australis CDK700 telescope array, its KiwiStar Optics precision fibre-fed echelle spectrograph, and other facilities to support:

- NASA's Transiting Exoplanet Survey Satellite ([TESS](#)) mission
- DLR's [SMARTnet](#) geostationary space debris survey
- [Twinkle Space Observatory's](#) exoplanetary and other studies.

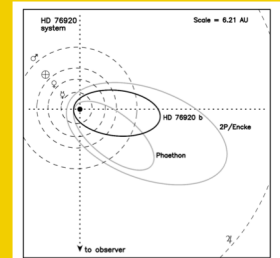
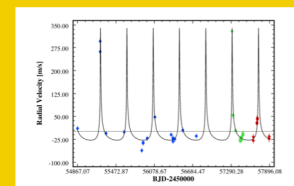


Southern sky star trails above Mt Kent Observatory.



Stellar magnetic field mapping

Maps of the large-scale surface magnetic field components for the young weak-line T Tauri star TWA 9A (Nicholson et al. <http://arxiv.org/abs/1807.07684>)



Exoplanet detection and characterization

Above: Keplerian fit for the eccentric orbit evolved-star exoplanet HD 76920b; Below: its orbit compared to Solar System objects with similar eccentricities. (Wittenmyer et al. <https://arxiv.org/abs/1711.05378>)



Mt Kent Observatory photos, left to right: the MINERVA-Australis main building and the dome for its telescope #1; the domes of two Shared Skies telescopes; the Shared Skies CDK700 telescope; a southern sky view.

See also:

Characterising the Solar wind in time using young stellar proxies, Evensberget et al. (poster 81)
The Magnetic Fields of M-type T Tauri Stars, Nicholson et al. (poster 222)