STARSPOT EVOLUTION ON ACTIVE LATE-TYPE STARS IN THE KEPLER FIELD - CYCLE 2

Alexander Brown
University Of Colorado, Boulder
GO20035

Starspots on late-type stars are a direct manifestation of the photospheric emergence of strong dynamo-generated magnetic fields. We propose to extend our Cycle 1 project of 30 minute cadence Kepler photometry, in which we are investigating how activity phenomena such as the growth, migration, and decay of starspots, differential rotation, activity cycles,and flaring operate on single and binary stars with a wide range of mass (and hence convection zone depth), with the expectation that such investigations will stimulate and enable theoretical studies of magnetic flux generation and transport processes in the extreme regime of fast rotation that any successful theory must be able to address. Our sample of 186 active stars was selected based on GALEX FUV and NUV imaging of the Kepler field. For accurately measuring the longitudes of active regions, spot filling-factor maps will be obtained from the Kepler photometry using light-curve inversion methods. Time-series analysis, using both Fourier and wavelet techniques, are used to obtain accurate rotation periods. After which the phased light-curves are processed with our existing inversion codes using both the Occamian approach and the Maximum Entropy method. A full suite of supporting high resolution optical spectroscopic observations will be obtained using the Hobby-Eberly, Keck, and Apache Point Observatory telescopes to accurately determine the stellar parameters, including effective temperature, surface gravity, and projected rotational velocity, and to identify which stars are spectroscopic or eclipsing binaries and measure their radial velocity curves. For many targets Doppler imaging, both conventional and magnetic, will be pursued.