NJC M Dwarfs Companion Search
Proposal for K2 Campaign 1 M dwarf Light Curves

N. J. Cook[1]*, D. J. Pinfield[1], B. Burningham[1], A. C. Day-Jones[1], H. R. Jones[1]

[1]Centre for Astrophysics Research, STRI, University of Hertfordshire, Hatfield AL10 9AB, UK

March 7, 2014

Science Case

We have a high quality, colour selected catalogue of M3 to M5 dwarfs, of which 405 fall into the Campaign 1 target area. These spectral types were defined using $V - J$ from Lépine et al. (2013) and Kepler magnitudes were estimated via the *K2 Ecliptic Plane Input Catalog, EPIC* (Kepler Team, 2014), in the range of $\sim$14 - 18, see Figure 1. Our M dwarfs are selected from the *Wide-Field Infrared Survey Explorer* (WISE, Wright et al., 2010) all sky data release combined with the *Two Micron All Sky Survey* (2MASS, Skrutskie et al., 2006) using stringent cuts in reddening, colour (See Lépine & Gaidos, 2011) and various accuracy cuts. For a more in depth description of our catalogue see Cook et al. (2013). We request cadences of 30 minutes in order to look for light curve signatures of brown dwarf and exoplanet companions. M dwarfs provide ideal targets for exoplanet searches, Tuomi et al. (2014) suggest that all M dwarfs could host super Earths in the mass range of 3 to 10 $M_\oplus$. Locating brown dwarf and exoplanet companions to M dwarfs is important to enable dynamical mass and transit radii tests of sub-stellar models, atmospheric studies and to place constraints on companion formation models.
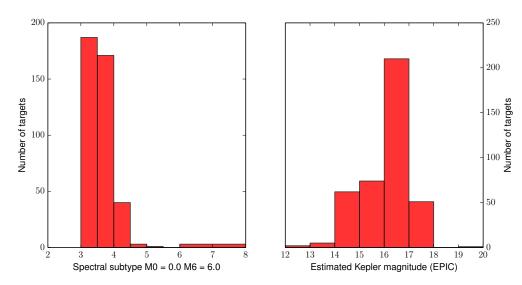

Figure 1: Histograms detailing the spectral types and estimated Kepler magnitudes (EPIC) for proposed M dwarf observation, Note that M dwarfs of later subtype than M6 are binned into a single bin due to $V - J$ estimation for types only earlier than M6.

References

Cook N. J., Pinfield D. J., Burningham B., Day-Jones A. C., 2013, Mem. Soc. Astron. Italiana, 84, 1032

Kepler Team, 2014, K2 Ecliptic Plane Input Catalog (EPIC)

Lépine S., Gaidos E., 2011, AJ, 142, 138

Lépine S., Hilton E. J., Mann A. W., Wilde M., Rojas-Ayala B., Cruz K. L., Gaidos E., 2013, AJ, 145, 102

Skrutskie M. F. et al., 2006, AJ, 131, 1163

Tuomi M., Jones H. R. A., Barnes J. R., Anglada-Escudé G., Jenkins J. S., 2014, ArXiv e-prints

Wright E. L. et al., 2010, AJ, 140, 1868

*E-mail: neil.james.cook@gmail.com