

A Study of Variability in a G-M Spectral Sequence of Nearby Field 00 Dwarfs

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Kepler observations of G – M dwarfs are the principal objects of interest for exoplanet detection and subsequent characterization. The nearby G-M dwarfs are high-priority targets since they will be the most accessible to detailed investigation, especially with distance-sensitive methods such as astrometry and coronagraphic imaging in addition to ultra-precise Doppler spectroscopy at high signal-to-noise ratios.

We propose that the *K2* mission obtain data for a sequence of nearby dwarf stars that are present in Field 00 and in the *Gliese Catalogue of Nearby Stars*. The descriptive target list of 8 nearby stars ranging from G0 to late M with distances from 7.8 to 25 parsecs is given in Table 1 below.

Table 1. Nearby G-M stars in *K2* Field 00

Star	Spectral Type	V	B-V	Distance (pc)
Gl 252	G0 V	5.74	0.57	16.95
Gl 233	K2 Ve	6.76	0.94	15.02
Gl 241	K6 V	8.13	1.02	17.54
GJ 3413	M0	13.18	1.42	18.87
Gl 239	M1 V	9.63	1.49	10.09
GJ 3402	M3	13.77	1.63	25.00
Gl 232	M6 V	13.30	1.76	8.33
GJ 1093	M8 V	14.83	1.93	7.76

None of the targets is a known, active flare star. While variability of the nearby dwarf M *flare stars* is well documented, the nature of variability in more quiescent objects in the solar neighborhood is relatively unknown. The kind of variability that could be expected includes low-amplitude rotational modulation (enabling the measurement of rotation periods for these nearby stars for the first time) and transient activity due to flares or photometric “flickering” in addition to new phenomena. It is interesting to note that Notsu et al. (2013; *ApJ*, 771, 127) find that superflares in stars with relatively slow rotation can be as energetic as those in more rapidly rotating stars, though the frequency of occurrence of such exceptionally violent outbursts is lower. The availability of two bright dwarf G and K stars, respectively, offers the opportunity to obtain asteroseismic observations at Short Cadence (SC). We recommend LC observations for the remaining targets.

A search of the database in exoplanets.org did not include these targets as stars known to have planetary companions. However, future searches at higher sensitivities with large ground and space-based facilities may eventually yield exoplanet detections for many of the nearby stars.

The monitoring of these targets is an important first step toward characterizing variability on apparently quiescent nearby stars in the field that could become first-priority targets for missions such as *JWST* as well as objects of interest for future large, ground-based telescopes such as *TMT*. The results will enable informed planning for future investigations of the nearby stars in an exoplanet system context. The attached target table has been formatted as requested. The J2000.0 positions include the correction for proper motion of these stars in the solar neighborhood.