

## roAp candidates in Field 0 of K2

The Kepler mission had only a few roAp stars in the FoV, yet those have led to significant discoveries about these strongly magnetic, high-overtone p mode pulsators. A prime example paper is "The first evidence for multiple pulsation axes: a new rapidly oscillating Ap star in the Kepler field, KIC 10195926" (Kurtz et al., 2011, MNRAS, 414, 2550). Other roAp stars in the Kepler show possible g modes (unprecedented and important for asteroseismic diagnostics) and even possible toroidal modes (never observed).

For detailed study of roAp stars taking full advantage of the unique oblique pulsation that they show, SC is needed, since periods are in the range 5-24 min. However, Murphy et al. (2013, MNRAS, 430, 2986) showed how "SuperNyquist asteroseismology" can be used to correctly select Nyquist aliases and work far above the nominal LC Nyquist frequency. Visibility is reduced, but roAp pulsations have been found in Kepler LC data with periods of only 6 minutes (Kurtz et al., in preparation). With K2 the distinction between true peaks and aliases will not be as clear as in K1, but aliases will still be smeared by the Rømer delay over the 80-d collecting period, so the technique will work. **Hence we propose 8 candidate roAp stars in Field 0 for LC observations.**

For Field 0 of the K2 mission there are two excellent candidates to be new roAp stars. From the ground prior to Kepler the WET (Whole Earth Telescope) organised an extended coverage campaign on the roAp star HR1217 that managed to get three weeks of data with less than 50% duty cycle, all at the expense of many months of work by ~50 astronomers. That project produced some of the most precise ground-based photometry of 14 micromag (Kurtz et al. 2005, MNRAS, 358, 651). It tested and confirmed important theoretical predictions about pulsation in the presence of strong magnetic fields.

The K2 mission is a revolutionary improvement on the massive ground-based effort that came before. There are two excellent candidates to be roAp stars potentially in Field 0, based on their spectral classifications and extremely peculiar Strömgren photometric indices, criteria that I used to find most of the know roAp stars. **We propose two roAp candidates for SC observations.**

The stars potentially in Field 0 are:

For SC: (HD, RA2000 degrees, DEC2000 degrees, V mag)

<b>48953</b>	6.780372	16.772444	6.8
<b>50186</b>	6.885042	25.311500	7.4

For LC:

<b>55228</b>	7.211572	16.084583	8.2
<b>47103</b>	6.628908	19.948667	9.1
<b>52181</b>	7.022550	20.097833	8.9
<b>50403</b>	6.901008	22.262556	9.1
<b>44903</b>	6.422444	23.056806	8.6
<b>268471</b>	7.064711	23.075222	9.7
<b>256008</b>	6.382672	23.273833	10.3