

PSM WP128 Document

Short Cadence (SC) Community Data Analysis Exercise

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Summary

- 1) For this initial exercise we will use *Kepler* data. It will test analysis of SC-like data, down to the PLATO LC Nyquist frequency of 833 μHz
- 2) We will select of order 60 *Kepler* targets for the first exercise but you may only need to analyse 20 (see 6 below).
- 3) The sample will span the full range in numax, down to the LC Nyquist. As such it will include some sub-giants with mixed modes.
- 4) Lightcurves will be 6 months long; we will make available both lightcurves and power spectra for distribution, along with archival peak-bagging frequencies, Dnu and numax (published values) as guideline data. This will be done for a *training set* only (see 6 below).
- 5) We will deliberately select high SNR targets for this first exercise; we will explore lower SNR, dataset lengths etc., in subsequent tests and exercises.
- 6) The exercise will have the following parts:
 - a) Part 1: We will ask participants to analyse a sub-set of about 20 of the *Kepler* targets (the *training set*). We will ask for a range of different types of results, which map to different stages of the full front-to-end analysis of PLATO targets. Participants can choose to provide one, several, or all types of results, depending on their codes/expertise etc. The types are:
 - i) Frequency range of detected oscillations [we will test detecting oscillations in much lower SNR data in subsequent exercises]
 - ii) Average seismic parameters
 - iii) First-guess frequencies for peak-bagging
 - iv) Best-fitting peak-bagging frequencies and uncertainties
 - b) Part 2: Since the PLATO pipeline will have to work in an automated manner on a large number of targets, for this part we will ask participants to make their codes available (e.g. on GitHub) for us to run in a “blind”, automated manner on the remaining 40-star *testing set*. This will provide results for comparison with the *training set*. We will provide full instructions on what is needed with regards to input and output formats (we will write suitable code-wrappers to handle dealing with the results).
- 7) We understand that not everyone who participated in Part 1 will be in a position to participate in Part 2. Moreover, we also understand that some codes provided for Part 2 may not be optimized for dealing with mixed-modes and sub-giants. However, we think the sooner we can see and understand the issues the better. Results will be handled carefully; we will provide useful feedback for participants to help guide development of their codes; and there will be follow-up exercises when improved codes can be tested and verified.
- 8) Milestones are:
 - i) Announce opportunity to participate and ask for expressions of interest
 - ii) Begin Part 1 (June)
 - iii) Deadline for Part-1 submission of results (beginning September)
 - iv) Deadline for Part-2 submission of codes (beginning September)
 - v) Analysis by WP128 leads of Part 1 results (September)
 - vi) Preparation for running codes for Part 2 (September)
 - vii) Analysis of results from Part 2 (October)
 - viii) Engagement/discussion: Feedback on results, lessons learned (November/December)