

Plato, WP 127

Seismic constraints from ageing stars

WP127



**Seismic constraints
from ageing stars**

B. Mosser

WP127 100



**Stellar models
of evolved stars**

P. Ventura

WP127 200



**Seismic diagnostics
for evolved stars**

A. Miglio

WP127 300



**Constraints on
main sequence stars**

J. Montalbán

WP 127

~~Red giant seismology~~

Seismic constraints from ageing stars

WP 127 deals with non main-sequence stars, **out of the core-programme**

→ We have to:

- pursue colleagues that red giants are (almost) as important as stars in the core programme
- show what we can do with red giants for the core programme
- define and select a red giant sample as big as possible

No red giant star in P1, P2, P3, P4

Tasks (cf Marie-Jo = WP120)

Specification for M, R, age, and other properties of the core program

Description of the algorithms, codes, pipelines, interfaces, tests

Grid of stellar modes and oscillation properties

Evolutionary codes

Validate PDC implementation

Red giants, as diagnostics and tests of physical processes

All points common with WP 121 → synergy WP 121 // WP 127
same people, same physics

Last point red giants = very limited extra effort
+ high scientific gain

Action show that NOT INCLUDING red giants decreases the performance on MS
Core program needs accurate ages; accurate ages need accurate modelling, so need RG input

WP 127 workshop: aims

- Selection of the targets, according to the goals of WP 127, in connection with GAIA; how can we choose the best evolved stars for addressing the main topic of the WP which deal with the [characterization of exoplanetary systems](#)
- Definition of specifications for identifying these best targets, according to the goals of WP 127, in connection with GAIA. There is a pending discussion among PLATO people between [long runs](#) or [step-and-stare](#). There is no secret: exoplanetologists prefer long runs. Inside WP 127, we have to find compromises between long runs (red giant seismology per se) or short runs (Galactic populations).

Each participant is invited to provide answers, when possible, or any elements that should help providing an answer, or should make pending questions clear.

- 30 minutes are allocated to each talk : 15 min presentation + 15 min questions

WP 127 workshop: schedule

Wednesday 25pm: PLATO/GAIA session

14:15	Goals of WP 127	B Mosser
14:30	Identification of red giants	C. Babusiaux → D. Katz
15:00	Characterization of GAIA targets: accuracy of GAIA astrometric and photometric data, identification of the bias in the target sample	C. Cacciari (skype)
15:30	Characterization of GAIA targets, accuracy of spectrometric GAIA data, identification of the bias in the target sample	U. Heiter
16:00	Coffee break	
16:30	Galactic physics with GAIA	D. Katz
17:00	Discussion → Actions	all

Thursday 26 am: "seismic constraints from ageing stars"

Exoplanets orbiting red giants

Red giant	Observations transit ; <i>RV</i>	$R_{\text{star}} / R_{\odot}$	$M_{\text{pla}} / M_{\text{jup}}$	Ref
HD 102956	<i>Keck</i>	4.4	0.96	Johnson et al. 2010
Kepler 56	Kepler	4.2	0.070 + 0.57 + 3	Huber et al. 2013
Kepler-91 / KOI-2133	Kepler	6.3	0.88	Lillo-Box et al. 2014
KOI-977	Kepler + <i>Subaru</i>	24.3		Hirano et al. 2014
Kepler-432 / KOI-1299	Kepler + <i>TRES</i>	4.06	5.4 + 2.4	Quinn et al. 2014, 2015
HIP 67851	<i>FEROS</i>	5.9	1.4	Jones et al. 2015
8 Umi	<i>BOES (Korea)</i>	9.9	1.5	Lee et al. 2015
EPIC-318	<i>K2 + Harps-N + Sophie</i>			Lillo-Box et al. arxiv
EPIC-888	<i>K2 + Harps-N + Sophie</i>			Lillo-Box et al. arxiv

Planets around giant stars

From the observational point of view, there is a [dearth of planets](#) with short periods around stars ascending the red giant branch

Johnson et al. (2007)

Close-in planets around giant stars: [Lack of hot-Jupiters and prevalence of multiplanetary systems](#)

Lillo-Box et al. (2016)

The detection of close-in planets around post main-sequence stars is crucial for [constraining theoretical models of planet engulfment](#).

Lillo-Box et al. (2016)

Action: contact these clever exoplanetologists

Next steps

- Selection of the targets
- Benchmark red giants