



Planet detection in PLATO

lessons learned from previous surveys

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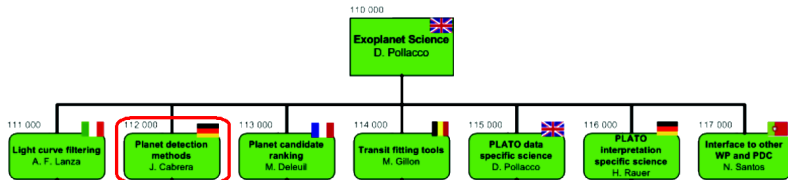


Planet detection in PLATO

WP 112 context

PSPM activities

ensure a maximum scientific return of the PLATO mission by refining the scientific requirements and specifications of algorithms and tools



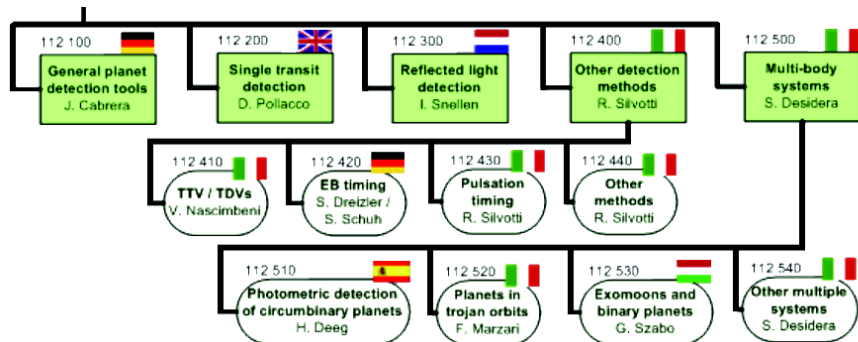
- ▶ WP 112 is within WP 110 (Exoplanet Science) in the PSPM
- ▶ WP 112 000 coordinates the WPs related to different planet detection methods:
 - ▶ transits, reflected light, multiple systems, other methods (TTVs, ...)

Planet detection in PLATO

WP 112 context

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Planet detection in PLATO

WP 112 methods

the approach of WP 112

- ▶ build on the experience acquired by previous surveys
- ▶ include a wide range of planet detection methods
- ▶ translate this methods into algorithms, requirements, and specifications to be implemented in the PDC
- ▶ improve existing tools and develop new ones suitable for the parameter range of PLATO
- ▶ work in close collaboration with WPs 111 (LC filtering), 113 (candidate ranking), 160 (AS), 360 (EAS)

Planet detection in PLATO

More about WP 112

- ▶ transit detection
 - ▶ see next slides and M. Pätzold's talk
- ▶ detection of planets through timing analysis
 - ▶ see R. Silvotti's talk
- ▶ planets around eclipsing binaries
 - ▶ see S. Dreizler's talk



Planet detection in PLATO

WP 112 100 transit detection tools

- ▶ building on the experience of SuperWASP and CoRoT
 - ▶ S. Aigrain, R. Alonso, A. Bonomo, L. Carone, S. Carpano, A. Collier Cameron, Ph. Eigmüller, D. Pollaco, A. Ofir, M. Pätzold
 - ▶ join Kepler and HAT
- ▶ developing new methods to fulfill PLATO objectives
 - ▶ PLATO will reach the region of the parameter space where transits are not short, nor periodic, nor shallow
 - ▶ see work by A. Miglio and J. Montalbán on seismology of giant stars
- ▶ lessons learned:

CoRoT: several detrending and detection tools

Kepler: single detrending and detection tool

- ▶ a single detection algorithm will not fulfill all the scientific objectives of the mission (Moutou et al. 2005, 2007)



Planet detection in PLATO

WP 112 100 transit detection tools

- ▶ analysis of Kepler Q1 data with CoRoT tools
- ▶ we find 52 new planetary candidates not published before
- ▶ among them several interesting candidates:
 - ▶ similar (in period and size) to the rocky planets CoRoT-7b and Kepler-10b
 - ▶ 6 new multiple systems
- ▶ this advocates for the use of complementary methods in space based surveys



Planet detection in PLATO

Summary

- ▶ ensure a maximum scientific return of the PLATO mission by refining the scientific requirements and specifications of algorithms and tools
- ▶ WP 112 000 coordinates the WPs related to different planet detection methods:
 - ▶ building on the experience acquired by previous surveys
 - ▶ improving existing tools and developing new ones suitable for the parameter range of PLATO
- ▶ WP 112 000 has produced already documentation for the PDC available through the EAS wiki and the PSPM wiki
- ▶ several activities foreseen for implementation phase, collaboration welcome