

Title: Algorithms, interfaces and frameworks for efficient cross-facility scheduling

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Abstract:

There is a new approach for maximizing simultaneous astronomical observations to obtain efficient Multi-Wavelength/Multi-Messenger (MW/MM) coverage. Such an approach is based on the optimization of a multi-observatory schedule to promote simultaneous observations of sky patches. We describe the STARS (Scheduling Telescopes as Autonomous Robotic Systems) software framework for telescope time scheduling developed at IEEC that has been extended to cover use-cases ranging from the scheduling of single telescopes to the scheduling of coordinated multi-observatory campaigns. The latter aims at fulfilling simultaneously the scientific goals of each facility, maximizing the time in which MW/MM coverage of the source is obtained, and given the other telescopes' schedules. The algorithms have been improved for this purpose and have shown good performance for different test cases, strategies, scenarios and observatory configurations. Special focus will be placed on describing the case of CTA (Cherenkov Telescope Array) and GASKAP (Galactic Australian Square Kilometre Array Pathfinder, a SKA precursor) and the coordination of the key scientific survey programs. In addition, a particular case on MM science for GW alert follow-up observations scheduled at the CTA North and South arrays will be described. Finally, the ASTERICS MM coordination platform and the developments to integrate the STARS framework as a stand-alone service in the platform will be presented as a new solution to coordinate observations for ground-based observatories and space-missions.