

Priority coordination of fiber positioners in multi-objects spectrographs

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Summary

In MOONS (Multi Object Optical and Near-infrared Spectrograph), a thousand optical fibers are moved to their pre-assigned targets by a 2-arm positioners to study specific parts of the universe. As some astronomical objects hold more information than others, ensuring their observations is a desirable feature, especially when not all the positioners can converge to their targets and are prone to deadlock. On top of a decentralized navigation function for collision-free motion, we propose a finite state machine algorithm combined with distance-based heuristics to take into account their priorities or importances, coordinating their movement accordingly. An improvement from 60-75% to 80-95% of "positioners to targets" convergence is obtained from simulation.

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