



An Unprecedented Commensal Drift-Scan Survey with FAST

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1. Extended Abstract

The Five-hundred-meter Aperture Spherical radio Telescope (FAST: Nan et al. 2011) has seen its first light on September 25, 2016. Major contracts, such as those of the actuators, dome-suspension integration testing, multi-beam L-band receivers, and etc. are still being worked on. We expect a minimum of two years' of commissioning, leading to a successful delivery of FAST as a national facility and fulfillment of the project's promise of making it available to the international communities.

The unique design of FAST makes feasible the most sensitive surveys of Galactic neutral hydrogen, HI galaxies, pulsars, radio transients, and ETI signals, toward the northern sky. The complexities of the FAST system, for example, the need to move and measure more than 1000 actuators with precision for tracking and pointing, necessarily limit its flexibilities and particularly, its speed. Considering the advantages and limitations of FAST, drift-scan will be predominant mode for large scale sky surveys with FAST for the foreseeable future, utilizing its full gain as well as circumventing its potential draw-backs, such as self-generated RFI and actuator faults.

With the 19-beam L-band feed-horn focal plane array, FAST is capable of covering the whole northern sky (2.3π) with about 220 24-hour drift scans. Considering maintenance, weather conditions, calibration, and substantial PI time, such a coverage will take at least two full years. The need to implement a commensal drift-scan survey mode thus become overwhelming. Although seems obvious and advantageous, such a comprehensive commensal survey has never been accomplished by a major single-dish observatory. The key challenge is to find the right compromise between the respective science teams regarding scan patterns, calibration schemes, other science considerations, and staffing requirements.

I will report here our current proposed solutions to these problems.

2. References

1 Nan, R., Li, D., Jin, C., Wang, Q., Zhu, L., Zhu, W., Zhang, H., Yue, Y. & Qian, L. 2011, "*THE FIVE-HUNDRED-METER APERTURE SPHERICAL RADIO TELESCOPE (FAST) PROJECT*", International Journal of Modern Physics D, Volume No.20, Issue No. 6