

An Unprecedented Commensal Radio Astronomy FAST Survey (CRAFTS) and its Early Results

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I will introduce our plan for a commensal radio astronomy FAST survey (CRAFTS), the unprecedented observing mode of which was proposed by my FAST team and is being tested at the Greenbank Telescope and Parkes telescope. In five years, CRAFTS has the potential to discover close to 1000 pulsars, 50 FRBs, hundreds of thousands of gaseous galaxies, and also produce the best HI ISM images to date. Such great potential necessarily implies great challenges. At an expected rate of 1.6GB/s, we expect to archive 10 to 20 PB per year, generate filtered, ranked meaningful events about 1 million a day. Our volume supersedes the current standard-bearer of time domain and big data astronomy, namely, LSST. I will discuss our concerns and plans. I will also report our first testing results and discoveries.

Dr. Li is now Chief Scientist of the NAO Radio Astronomy Division. After earning his BSc from PKU (1995) and PhD from Cornell University (2002), he became an astronomer at Harvard-Smithsonian Center for Astrophysics, and a research scientist at JPL/Caltech. He has led numerous programs using VLA, GBT, Arecibo, FCRAO, SWAS, Spitzer, Herschel, SOFIA and ALMA. He pioneered several observing and data analysis techniques, including HI narrow self-absorption technique and a new inversion solution to the dust temperature distribution. These techniques facilitate important measurements of star forming regions.

His work was featured on *Nature* as a research highlight. He obtained the US National Research Council “residence research fellow” award and was a member of the NASA outstanding team award (2009). He is now leading the science preparation efforts of the Five-hundred-meter Aperture Spherical radio Telescope (FAST). He served on the Steering Committee of Australia Telescope National Facility (ATNF), and is now co-chair of the “Cradle of Life” science working group (SWG) of SKA, and a member of the Chinese Academy of Sciences Major-facilities Guidance Group, an advisor to the Breakthrough Listen initiative.