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The Transient Sky viewed through the Five-hundred-meter Aperture Spherical radio Telescope (FAST)

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Inspired by the visionary efforts of building Arecibo, the Five-hundred-meter Aperture Spherical radio Telescope (FAST) was formally established in 2007; its construction commenced in 2011; achieved first light in 2016; started normal operation in 2020. The first internationally open call-for-proposal was released in March 2021. I report here a few science highlights so far, particularly from the Commensal Radio Astronomy FAST Survey (CRAFTS), which is an unprecedented large-scale commensal radio survey enabled by a several novel techniques. CRAFTS simultaneously records pulsar, Galactic HI, extra-galactic HI, and transient data streams. CRAFTS has discovered more than 150 new pulsars, including more than 40 MSPs, more than 20 binaries, and at least one DNS system. We have imaged about 5% of the full sky in HI, including the Lockman hole, the Orion region, etc. CRAFTS has also resulted in 6 new FRBs, including one high DM repeater that has since been localized and is shown to be the FRB with the largest fraction of local host DM. Other dedicated programs have provided the stringiest limit on the radio flux of the Galactic FRB source, the first evidence of 3D alignment between a pulsar's spin axis and spatial velocity, the most radio faint pulsar through a search of unassociated Fermi sources, etc.

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