

First detection of Fast Radio Bursts by CHIME/FRB

This past July saw a major milestone in the history of the CHIME telescope: its first detection of Fast Radio Bursts (FRBs) as part of the CHIME/FRB project.

The Canadian Hydrogen Intensity Mapping Experiment (CHIME) is a revolutionary “software” radio telescope recently built near Penticton, BC, on the grounds of the National Research Council’s Dominion Radio Astrophysical Observatory, by a team led by McGill, U. Toronto and UBC researchers. CHIME is a Canada Foundation for Innovation-funded initiative to map the cosmos, originally to study the accelerating expansion of the Universe and Dark Energy. CHIME’s great sensitivity and very wide field of view – thanks to its unusual cylindrical reflectors coupled to the world’s most powerful correlator – also make it the world’s most powerful FRB detector.

MSI faculty, staff, postdocs and students played a leading role in the design, implementation and commissioning of the CHIME/FRB instrument and software pipeline, and saw the first fruits of their labours in Summer 2018 with the detection of FRB 180725A. This event demonstrated for the first time that the FRB phenomenon is observable to frequencies down to 400 MHz, far lower than had been seen prior.

The team continues to commission the CHIME/FRB system and hopes to have it fully operational by the end of the 2018 calendar year. Simultaneously, the CHIME/FRB team is poised to make major progress on the FRB puzzle this coming year as it pours through the wealth of data offered by this extraordinary telescope.

Boyle, P. C., & CHIME/FRB Collaboration. (2018). First detection of fast radio bursts between 400 and 800 MHz by CHIME/FRB. *The Astronomer’s Telegram*, 11901.

Right, from top: Dynamic spectrum plot of first detection of a fast radio burst between 400 and 800 MHz by CHIME/FRB; CHIME at night - the telescope consists of 4 parabolic cylinders 20 m wide and 100 m long, with a focal length of 5 m. It has no moving parts, relying instead on the Earth’s rotation to move across its field of view.

The CHIME/FRB Collaboration is led by McGill and involves nearly two dozen MSI undergraduates, graduate students, postdocs and staff, led by MSI Professors Vicky Kaspi and Matt Dobbs.

Why this is important

Going forward CHIME/FRB is poised to detect hundreds of Fast Radio Bursts, far more than any experiment. This will lead to great progress on this new astrophysical mystery.

