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Two years of observations with the CHIME/FRB experiment

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Fast radio bursts (FRBs) are extra-galactic radio transients of unknown origin [1]. Many theories have been proposed [2] to explain the high luminosity of the bursts, their $\sim$ millisecond duration and their large number ($\sim 1,000\,\mathrm{sky}^{-1}\,\mathrm{day}^{-1}$ above 1 mJy [3]). However, there currently is no single accepted theory capable of explaining all the properties of these sources. The interest in FRBs is also motivated by their potential as probes to study the medium in their host galaxy and between galaxies, opening the possibility of unprecedented studies of the Universe's large scale structure and the location of the 'missing baryons' [4].

In the past, most studies of FRBs were limited by the small number of sources known. This was due to the trade-off between sensitivity and field-of-view for traditional single-dish telescopes. Therefore, despite a large number of FRBs reaching Earth every day, only a tiny fraction could be observed with a sensitivity sufficient to detect them. With the advent of high-sensitivity, large field-of-view interferometers, the field of FRBs is currently undergoing a revolution. The Canadian Hydrogen Intensity Mapping Experiment (CHIME) is a transit interferometer formed by four cylindrical North-South reflectors and 1024 dual-polarization antennae[1]. CHIME observes an instantaneous field-of-view of $\sim$ 200 square degrees with a sensitivity comparable to the largest steerable radio telescopes. CHIME/FRB is an experiment running on CHIME that aims to discover and study a large number of FRBs. By using dedicated hardware and a fully automated pipeline, CHIME/FRB constantly monitors the sky with a millisecond cadence and stores both intensity and raw voltage data products for every detection [5]. In this way, not only can many sources be detected, but they can be studied in great detail using off-line pipelines. For example, the *baseband pipeline* automatically processes the raw voltages, providing sub-arcminute localization of the bursts and a measurement of their polarization properties [6].

Since the first FRB discovered in 2018, CHIME/FRB has observed hundreds of new FRBs. A catalog with the proprieties of the first 500 FRBs is submitted and I will summarize some of the main results. I will also present some notable sources that strongly constrain possible progenitor models. For example, a repeating FRB localized to a nearby spiral galaxy [7] has shown a periodicity in its activity level [8], and a galactic FRB has been observed from a magnetar [9, 10] Finally, I will present some of the projects currently under development that will make use of CHIME/FRB data, such as CHIME/Outriggers that will localize hundreds of FRBs with great precision in the near future.

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