W54a Detection rate of fast radio bursts in the Milky Way with BURSTT

D. F.-J. Ling (NTU), T. Hashimoto (NCHU), S. Yamasaki (NCHU), T. Goto (NTHU), S. Kim (NTHU), S. C.-C. Ho (ANU), T. Y.-Y. Hsiao (JHU), and Y.-H. V. Wong (CU Boulder)

Fast radio bursts (FRBs) are intense bursts of radio emission with durations of milliseconds. Although researchers have found them frequently happening all over the sky, they are still in the dark to understand what causes the phenomena because the existing radio observatories have encountered certain challenges during the discovery of FRB progenitors. The construction of Bustling Universe Radio Survey Telescope in Taiwan (BURSTT) is being proposed to solve these challenges. We simulate mock Galactic FRB-like events by applying a range of spatial distributions, pulse widths, and luminosity functions (LFs). The effect of turbulent interstellar medium (ISM) on the detectability of FRB-like events within the Milky Way plane is considered to estimate the dispersion measure and pulse scattering of mock events. We evaluate the fraction of FRB-like events in the Milky Way that are detectable by BURSTT and compare the result with those by Survey for Transient Astronomical Radio Emission 2 (STARE2) and Galactic Radio Explorer (GReX). We find that BURSTT could increase the detection rate by more than two orders of magnitude compared with STARE2 and GReX, depending on the slope of LF of the events. We also investigate the influence of the specifications of BURSTT on its detection improvement. This leads to the fact that greatly higher sensitivity and improved coverage of the Milky Way plane have significant effects on the detection improvement of BURSTT. We find that BURSTT-2048 could further increase the detection rate of faint Galactic FRB-like events by a factor of 3.