

# 利用 GNSS 斜向全電子含量觀測修正 BURSTT 計畫 之電波天文測位

## Using GNSS Slant TEC Measurement In Radio Astrometry Correction for BURSTT

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### 摘 要

BURSTT 是一項在台灣進行的電波天文實驗，旨在偵測來自遙遠星系未知來源的毫秒級電波爆（快速電波爆，FRBs）。除了偵測 FRBs 之外，BURSTT 的另一目標是辨識每一道 FRB 的母星系。這項工作透過比較電波爆在數百到數千公里範圍內不同觀測站的抵達時間來達成。傳統上，大氣層效應的校正是藉由參照鄰近已知目標來進行。然而，由於 FRB 的出現方向與時間都難以預測，因此要進行精確的天文定位校正並不容易。另一方面，全球導航衛星系統（GNSS）衛星已持續對電離層延遲進行測繪。本研究探討了一項新構想：利用指向個別衛星的斜向全電子含量（slant TEC）測量，來修正電波觀測的誤差。我們將呈現初步結果與這項方法的限制。

關鍵字：電波天文學，電離層，全電子含量，快速電波爆

### Abstract

BURSTT is a radio experiment in Taiwan looking to detect millisecond bursts in radio frequency (Fast Radio Bursts, FRBs) that originates from unknown sources located in distant galaxies. In addition to detecting the FRBs, BURSTT also aims to identify the host galaxy of each FRB. This is achieved by comparing the arrival time of the burst to a series of stations that are 100s to 1000s kilometers apart. Conventionally, the effect of atmosphere is calibrated by referencing the observation to a nearby known target. However, since FRB is unpredictable in direction and time, adequate astrometry calibration is non-trivial. On the other hand, the GNSS satellites already maps the ionospheric delays all the time. In this study, we explore the concept of employing the slant TEC measurements toward individual satellites in the correction of radio observations. Initial results and limitations will be presented.

Key words : radio astronomy, ionosphere, total electron content, fast radio burst