Protection Progress of Radio Astronomy Service in China

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Extended Abstract

Radio Astronomy Service (RAS) is a service which is based upon the reception of radio waves of cosmic origin [1]. Due to the extreme weakness of cosmic radio emission in comparison to the strength of the man-made transmitters, radio astronomy observations are highly vulnerable to radio interference (RFI) from the other services. In order to protect the radio environment of the high sensitive radio telescope, radio quiet zones (RQZs) have been implemented by some Administrations in order to optimize the environment in which observations are carried out [2].

In recent years, several advanced radio telescopes in China have been constructed or proposed. Due to the requirement of deep-space exploration and high-sensitivity radio observations, a new large telescope, Tianma 65 meter radio telescope (TMRT) near Shanghai has been operated. Meanwhile, in order to understand fundamental processes in the solar eruptive phenomena, the Chinese Spectral Radio Heliograph (CSRH) in 0.4-15 GHz range with high time, space and frequency resolutions has been constructed in Inner Mongolia. Moreover, the main structure of Five-hundred-meter Aperture Spherical radio Telescope (FAST) has been completed in September 2016 after five and a half years construction in Guizhou province. In addition, the proposed 110m radio telescope (QTT) in Xinjiang province will cover frequency band from 300 MHz to 110 GHz, and 90 m radio telescope in Yunnan province (JDT) will be used at the frequency band between 300 MHz to 9 GHz. In the South Pole, a 5 meter THz radio telescope has been planned.

Meanwhile, the radio telecommunication services have been developed rapidly. Till now, China has had the largest number of mobile phone users which is more than 1.3 billion, and more than 0.5 billion users have used 4G mobile services. The protection of the local radio environment around the radio telescope becomes more urgent and essential. Basing on the cooperation with the international and domestic experts of spectrum management, several actions have been taken to improve the local radio environments around the telescopes recently. For example, the registration of the new radio station to International Telecommunication Union is ongoing. Moreover, the revision of the Chinese Radio Regulation (CRR) by updating the footnotes CHN11 and CHN12 has been suggested to protect the frequency bands of RAS at the special sites in China. At the same time, several RQZs have been established and maintained around the telescopes such as FAST RQZs with radius 30 km, CSRH RQZs with radius 10 km [3] and Delingha RQZs with radius 26 km. In addition, the proposed RQZs around the new telescopes such as QTT and JDT have also been planned, and further coordination with the local governments is underway.

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