

EMC Study in Chinese Spectral Radioheliograph

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There are always the Electromagnetic compatibility (EMC) problems where the electromagnetic phenomenon exists. EMC is an inescapable problem in radio astronomy and also common problem for radio astronomical telescopes.

The under construction Chinese Spectral Radioheliograph (CSRH), as a new generation dm- λ to cm- λ radioheliograph, locates in Ming-An-Tu (MAT) Observatory Station in Inner Mongolia, is a solar-dedicated radio image observing equipment with high frequency coverage, big array coverage area, complicated structure and function. Its total 100 antennas spread over about 10 square kilometers. Solar physical scientists are paying much more attentions than ever on its progress.

Meanwhile, Ming-An-Tu observatory infrastructure providing the logistic services for CSRH will be constructed in the coming year. This will bring changes to CSRH EMC environment. The EMC requirement is not so severe like other night radio astronomy, and a radio quiet zone with 10km radius around MAT Observatory Station has been set up, the CSRH electromagnetic environment is still becoming worse than ever and need to pay more attentions to confront the problem, especially in its low frequency array CSRH-I.

To guarantee this big distributed system to reach its science goals with good performance, there are too many works to do further and in detail. In engineering, EMC is a systematical and comprehensive problem. Although preliminary CSRH EMC works have been done on site selection and electromagnetic environment protection, deeply and systematical EMC study of CSRH are still very important and necessary with emergency for CSRH to achieve its best scientific output. The CSRH EMC issues come from mainly two parts: 1) RFI from outside of the CSRH, the ground-based RFI sources and satellites communication signal; 2) RFI from inner side of the CSRH or MAT.

This paper will focus on three aspects: 1) EMC study and design consideration for CSRH; 2) Ming-Au-Tu Observatory electromagnetic shielding scheme designing and implementation; 3) Radio frequency interference surveillance.