

SHAO Summer Internship Logging: 5

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This is the first day of the second week of my internship, in brief, I have given a presentation about what I have done for the first week and information about blind search. I will first summarize the content of the meeting.

First, we discussed that eyes inspection for PSR from the profile is not efficient. DM CHI-square reduced, Pdot CHI-square reduced, and P CHI-square reduced data should be extracted from the program and compare with a successful PSR parameters to decide. How to set the parameters for successful PSR? This is a statistic issue.

Second, DM seems like an essential factor for blind search. There are mechanisms to set the range of DM, maximum dDM. This is related to the De-Dispersion Plan (DDPlan). It is a function included in PRESTO. Understanding it's mechanism will be crucial for blind search.

Thrid, Dr. Guo suggested whether we can accelerate the blind search with looping other parameters, such as P0. Personally, I think this is not possible as the P0 is determined after the data is de-dispersed.

Fourth, Prof. An suggested we should explore the details of factors that affect the sensitivity. In general, dispersion smearing, system temperature, integration time, beam model, some other PSR intrinsic properties.

During the weekend, I focused my attention to the PRESTO manual, Jodrell Bank Observatory resources, and a thesis written by Mayuresh Surnis. I aimed to gather information about blind search.

PRESTO manual presents an example of processing GBT observation data and detects a PSR. The central frequency of the search is 1400MHz which not low-frequency observation as MWA. At high frequency, the scattering and dispersion smearing are less significant. I would argue whether PRESTO is the best tool for MWA pulsars blind search. PRESTO may not have the tool to deal with low-frequency noise and harmonics.

To highlight, the thesis written by Mayuresh Surnis has very detailed information about pulsar search and timing. I aim to learn the fundamental knowledge and get insight from his serious work. For instance, the data analysis part explains what are the RFIs, harmonics search, DM and dDM issue, and so on.