

Dear SMA-T Users,

Attached below are advices to our local SMA users from the three people from Taiwan who served in the joint SMA Time Allocation Committee (TAC) in 2012 spring. The Joint-TAC reviews all SMA proposals submitted to SAO and ASIAA. These are sincere personal advices rather than official statement from the TAC. We hope these help improve your proposal in the next round.

Best regards,

Wei-Hao Wang, Shih-Ping Lai, and Kazushi Sakamoto

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From Wei-Hao Wang

1. Always keep your proposal easy to understand. It's likely that your proposal will be read by at least one or two good astronomers who are not experts in your field. Sometimes it is even possible that none of the SMA TAC members is an expert in certain field. How do you convince those people your case is important?
2. Be clear on what you would like to test. What's the hypothesis? What features in an image or what correlation in a sample are you looking for? What are the possible outcomes of your SMA observations and what does each case imply? Will even a non-detection be useful?
3. Are you using the SMA wisely? Why do you require an interferometer but not a single-dish? Are your requested S/N and resolution sufficient for your science?
4. Filler tracks and bad weather (PWV>2.5mm) tracks, and/or short pilot program can be used to test feasibility for a larger/ambitious program.
5. Be very careful on sample size. Too large a sample can lead to too much observing time. Too small a sample may not answer your scientific questions. Observing a small sample on the SMA to establish a case for a larger sample on ALMA seems to be an appealing strategy to the SMA TAC.
6. SMA is evolving in the ALMA era, both its capability and how the TAC evaluates observations. A good/poor case two years ago may not be viewed the same next year. If you cannot sense where the wind is blowing, write more and propose more. You will get your fair share of luck.

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From **Shih-Ping Lai**

### **Advises to proposers – my experience as a SMA TAC member**

In the past two years, I served as an ASIAA representative for the SMA Time Allocation Committee (TAC). Sitting with a group of 15 TAC members and discussing the good and bad of many proposals every half year gives me an up-close view of how things work in the reviewing processes. Truth be told, it is much easier to judge other people's proposals than actually producing a perfect proposal. The background of each TAC members may be different, but the questions they ask are quite similar. Knowing these questions in advance and knowing how proposal reviewers think should help people prepare their proposals. Unfortunately, for practical and privacy reasons, not everyone can sit in one of those educational and informative TAC meetings. Here I am attempting to reveal the secret behind that close door in order to provide useful information for astronomers in Taiwan.

The most important question a TAC member would ask is probably

*“What is the big picture?”*

In other words,

*“What is the scientific question the observations you request can solve? and why is it important?”*

Of course, the answer to these questions should be the main part of your “Scientific Justification”. However, in order to convince your reviewer to give you the time you want, you need to be careful about the following aspects:

1. Be clear and simple! Don't think your reviewer is a genius or a psychic who can read your mind just by glancing through your proposals. Yes, “glancing” is what most reviewers would do to your proposals. In each semester, roughly 35 SMA proposals would be assigned to me, and I have to submit my comments in about a month. Remember that reviewers have their daily work and research to do. Therefore, typical reviewers may only spend ~30 min to read your proposal. Your job is to impress the reviewer in such short amount of time. If you can't clearly state your case, that would trigger an impatient reviewer to give you a low score.
2. Don't assume that the reviews know the background knowledge of your research topics. Most of the time, I review the proposals close to my own research field, but occasionally I will get some proposals of subjects I am totally unfamiliar with. It's up to you to educate a reviewer who is not as knowledgeable as you on the subject. You have to assume that the reviewers don't know everything you know. You don't get the chance to blame the TAC for assigning your proposal to people who don't know your subject. You don't get to test if the reviewer is smart enough. So, the only thing you can do is to provide the necessary knowledge to the reviewers.
3. Describe what you want to do precisely. Some people would say, “Therefore, it is important to observe something”, but leave little clue for the reviewers to figure out why your observations are indeed important. The connection between your proposed observations and the scientific problem you want to address has to be clear. One

common question a reviewer would ask is “*What is the path from data to the scientific goal?*” In other words, “*How exactly do you plan to use your data?*”

4. Show predictions. If you can show the expected results with modeling or theoretical work, do it! Make the prediction visible with figures give an impression that you are highly prepared. This is in general a big plus for your proposal.

After convincing the reviewers you do have an important scientific problem to solve, you still need to show them these three things:

1. Source/Sample selection. “*Why do you want to observe this particular object?*” If you just propose to observe one target, you need to show that your target is indeed interesting. For example, many people have already observed the kinematics of massive star-forming cores. Now, if you want to observe another one, even if your target has not been observed before, it is not particular interesting unless you clearly address “*why it is important to observe one more source*” or “*why is your target special*”.
2. Time request. You can't be too greedy, but you can't be too polite, too. You need to do your best job to estimate the time you need to achieve your goal, and don't request the extra time you don't need. Asking too much or too little both show your lack of knowledge. If you want to do a survey, you need to justify the size of your sample is enough for achieving your scientific goal statistically. If you need a big survey to achieve your goal but are not completely sure about your strategy, you'd better ask small amount of time first for verifying the technique of your experiments. It is much easier to get large amount of time if you can demonstrate that your strategy works. One common problem is that the proposers ask too little time for modeling work. If all you want is a simple detection, 3-sigma level detection would be good enough. However, if you want to model a complicate structure, such as Keplerian rotation, you may need a lot more than 3-sigma level detection.
3. Telescope/Instrument selection. “*Why do you need to use this particular telescope or instrument?*” This is a less frequently asked question for SMA, perhaps due to the uniqueness of SMA frequency range. But sometimes the reviewers may expect that you could get better results with other telescopes. For example, if you want to observe a faint and cold source, you might want to use CARMA to observe the lower transition of some molecular line. It would be better for you, if you have already provided the answers.

In short, an effective proposal should deliver your scientific idea concisely and precisely. Your reviewers expect to see a well-written short and clear proposal. It is not in your benefit if you disappoint your reviewers.

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From Sakamoto Kazushi

**Start early.** Writing a good proposal takes time.

**Carefully Read the Call for Proposals and Technical Description of the SMA.** About one in ten proposals that I reviewed were for targets that should be observed in the next semester. SMA does not operate in day time and this limits the source RA to a certain range for each semester, as described in the Technical Information associated with the Call for Proposals. If you still want to observe out-of-season sources you need to clearly state the reason and show that your science goal can be achieved with partial tracks.

**Clearly state your target sensitivity and justification for that.** Sensitivity calculation for an interferometer is more complicated than for filled-aperture telescopes. Ask local experts around you (for that you need to start early).

**Consider using filler programs** if you only need a small amount of data.

**Ask multiple people around you to read your proposal draft** (and start early for that). It is best if your own reviewers include people familiar with your research and people who has astronomy background but do not work in your field. Your proposal needs to impress experts in your research area and at the same time be comprehensible and interesting to reviewers working in other research area.

**Clearly state a concrete goal of your proposed research.** You may want to measure X to an accuracy of Y%, establish the correlation (or lack of it) between A and B, find out the structure of P to verify your working hypothesis Q. State your goal clearly and build your observing plan to achieve it. You also need to show how you will reach the goal from your data if the goal is not just detection. For example, showing your analysis tools with simulated data is a good way to tell reviewers that you are well-prepared. Also, a well designed experiment can obtain meaningful information even out of negative results e.g., by rejecting theoretical prediction or working hypothesis. Telling such plan B may well make your program look more robust.

**Give context to your research.** Tell the reviewer what the astronomical community will learn anew from the measurement of X, correlation of A and B, or the verification of the working hypothesis Q, for example. If the new knowledge will rewrite textbooks, say so. This is very important because what the TAC tries is to make a portfolio of programs to maximize the new scientific knowledge out of the SMA.

**Start each paragraph with its topic sentence**, as I have been doing in this text.

#### To Seasoned Users

**Do not hesitate to propose a big project.** It is up to you whether to make it a single legacy proposal or multiple mid-size proposals. We are funding and operating the SMA to make significant scientific progress. The SMA TAC does regularly award legacy status or several tracks to a small number of highest rank projects.

**Risky programs are ok, in my opinion.** Reaction to such proposals vary from one reviewer to another. But there are TAC members who think it worth taking a well-calculated risk for a possible high return. It is perfectly fine to submit high-risk-high-return proposal along with your more conservative programs because there is no limit for the number of proposals one can submit.