Tutorial in proposal writing

Hans Zinnecker
DSI/SMO (retired)

how to write a good SOFIA proposal

Some insights from previous SOFIA TAC experiences

PS. I was the chair of the German SOFIA Cycle 6 TAC

the obligation to write a unique SOFIA-only proposal

PS. remember 1 SOFIA flight is approx 1 million USD

9 criteria (proposal outline)

1) short scientific context (no lengthy introduction)
2) well-posed, specific question (key): why SOFIA?
   NB. first check Spitzer and Herschel archives
3) observational approach to answer the question
4) target selection: a) statistical or b) key object
5) Choice of instrument, feasibility (S/N, obs. time)
6) Key figures and figure captions (why relevant)
7) Other: value of null result, high risk – high reward
8) Well-written abstract (referee's first impression)
9) catchy title (preferably not too long, sales point)

helpful extra’s (spicing up your tale)

- Numerical simulations, if appropriate (for example, simulated observations, or new theor. predictions)
- A team with the right mix of people, incl. theorists, that will help with the interpretation of the data
- a good publication record (w/ previous SOFIA data) and the promise of news-worthy public outreach
- Synergy with important data from other telescopes such as APEX, ALMA or IRAM-30m and NOEMA
- an exciting abstract and SJ (without sloppy typos) like telling “a story” (referees remember “stories”)

Building the potential target list

- After checking ”obvious” targets and doing literature search, there appears to be remaining discovery space for the project
- Study the relevant Science Instrument website and scan Observers Handbook to get a better idea of what are the critical drivers of sensitivity
- Now, further elaborate a potential target list and begin numerical feasibility estimate based on the sensitivity metrics

My take home message:

1. What is the question that we are trying to answer (a key issue in the big picture)
2. How can we hope to answer the question with SOFIA, and only SOFIA
3. Details of the proposed observations (instrument, convincing feasibility, S/N)
4. Required ancilliary data (and possible synergies with other facilities, eg JWST)
5. Limitations, eg. In the case of FIFI-LS observations, why is it ok to sacrifice high spectral resolution and hence dynamical information (ie. why not GREAT?)
6. In the case of a risky proposal, say what we would learn from a null result ...