FORCAST (5-40 μm)

Preparing Imaging/Spectroscopy Proposals

Initial Plan

- Check If source already observed in archives. Everything is in IRSA
  https://irsa.ipac.caltech.edu/Missions/sofia.html
  - **TIP:** Early Cycle observations had poor WCS so start target searches with very large radius of ~ 600 arcseconds then try decreasing.

- Check Feasibility of observations. Use SITE to estimate S/N.
  https://dcs.arc.nasa.gov/proposalDevelopment/SITE/index.jsp
  - **TIP:** Flux estimates from recent missions WISE, SPITZER, MSX etc… are generally fine. If you still only have IRAS flux points treat this as an upper limit. Try seeing if the observations works if the flux is reduced by a factor of 2 or 3X which is not unusual from experience.

- *Download the latest USPOT Tool
  https://dcs.arc.nasa.gov/observationPlanning/installUSPOT/uspotDownload.jsp

- Confirm filters wanted are available during the Cycle
  https://www.sofia.usra.edu/science/proposing-and-observing/observers-handbook-cycle-9/4-forcast/41-specifications#Filter%20SuiteFORCAST
  - Some shorter wavelengths are not always available <7um
  - The N' 11.2 um filter has bad image quality when paired with the dichroic and is not available, though is fine in single channel mode.

Initial Plan

- Start a general observation plan in USPOT see FORCAST Cycle 9 details https://www.sofia.usra.edu/science/proposing-and-observing/observers-handbook-cycle-9/4-forcast
    - Choose a mode **NMC** (if compact source) **C2nC2** if very extended source where you need to chop off of to avoid contamination.
    - C2NC2 is overall less efficient so should be used only when there is no nearby clear sky.
        - **TIP:** When checking if off-source image is clear, use MSX image at nearest wavelength as that is roughly close to our sensitivity. WISE is next best though generally more sensitive. SPITZER is not ideal as due to its sensitivity it almost always sees low-level extended emission FORCAST won't detect.
    - For spectroscopy **NXCAC** is essentially the equivalent of C2NC2
    - FORCAST Spectroscopy cannot choose the angle of the slit
        - **TIP:** Sometimes it is possible to plan the observation at a point of the night where the slits is roughly at the position angle needed. However, this is difficult to plan.
        - **TIP:** Another way around this is to use several slits or even slit scan to cover a larger area, however this can add quite a bit of time to the observation.
        - **TIP:** Aim for a S/N ~50 for a good Telluric correction.
    - Remember SOFIA is a *plane* that needs to return home so can't stay on single target all night. Typical observation legs ~ 2hrs. Maximum leg is around 4 hrs so make sure long observations are divisible into such segments and can be aligned.

EXAMPLE

- Live Demonstration

- For previous video demonstration in more detail see
  - **IMAGING:**
    https://www.youtube.com/watch?v=WcEYPLaFbUI&feature=youtu.be

  - **SPECTROSCOPY:**
    https://www.youtube.com/watch?v=66tMdhXXY2w&feature=youtu.be

FINAL Tips

- If doing a FORCAST mosaic currently we don't have a mapping mode so each position should be planned as a separate AOR
  - Make sure to account for possible rotation of field so you have sufficient overlap.
  - FORCAST suffers from distortion with can cause astrometry to be off by 1-4 pixels at edges so can make exact alignments somewhat difficult.
  - We now offer LEVEL 4 FORCAST where we stitch together a mosaic as a product for the GI, though this take more time that the LEVEL 3 release.
  - Contact sofia_help@sofia.usra.edu for help in planning.
- If you have any questions, feel free to contact help desk sofia_help@sofia.usra.edu