
Report on SPIE Symposium Astronomical Telescopes and Instrumentation

Amsterdam
1-6 July 2012

Erick Young
SCTF 8/1/2012

General

- Venue
 - Amsterdam RAI Center
- Conferences
 - Space Telescopes and Instrumentation 2012: Optical, Infrared, and Millimeter Wave
 - Space Telescopes and Instrumentation 2012: Ultraviolet to Gamma Ray
 - Ground-based and Airborne Telescopes IV
 - Optical and Infrared Interferometry III
 - Ground-based and Airborne Instrumentation for Astronomy IV
 - Adaptive Optics Systems III
 - Observatory Operations: Strategies, Processes, and Systems IV
 - Modeling, Systems Engineering, and Project Management for Astronomy V
 - High Energy, Optical, and Infrared Detectors for Astronomy V
 - Modern Technologies in Space and Ground-based Telescopes and Instrumentation II
 - Software and Cyberinfrastructure for Astronomy II
 - Millimeter, Submillimeter, and Far-Infrared Detectors and Instrumentation for Astronomy VI

Plenary Talks

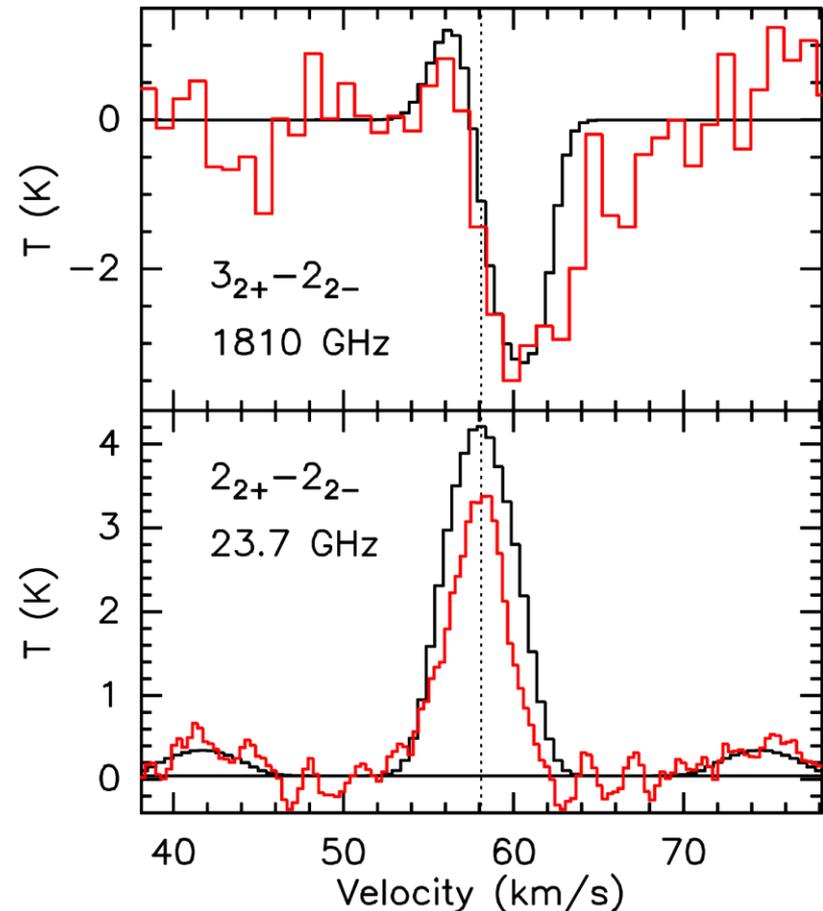
- JWST update - Heidi Hammel
- Exoplanets, unraveling a new paradigm - Didier Queloz
- Kepler update – Nick Gautier
- Antarctica astronomy - John W. V. Storey
- Very high energy gamma-ray astronomy with the HESS telescopes - Werner Hofmann
- The cosmic microwave background: observing directly the early universe - Paolo De Bernardis
- ALMA construction and early science - Thijs de Graauw

SOFIA Observatory Talks

- SOFIA in operation: telescope performance during the basic science flights - Hans J. Kärcher
- A new backup secondary mirror for SOFIA - Martin J. Burgdorf
- Upgrade of the SOFIA target acquisition and tracking cameras- Manuel Wiedemann
- Early science results from SOFIA - Erick Young
- Active damping of the SOFIA Telescope assembly- Paul J. Keas
- Evaluation of the aero-optical properties of the SOFIA cavity by means of computational fluid dynamics and a super fast diagnostic camera, Christian Engfer
- Optical characterization of the SOFIA Telescope using fast EM-CCD cameras, Enrico H. Pfüller
- SOFIA observatory performance and characterization - Pasquale Temi

THz NH₃ as a Probe of Infall

- Observations of NH₃ 3₂₊ – 2₂₋ line at 1810.4 GHz in three sources: W43 MM1, G31.41+0.31, and G34.26+0.15
- Systemic velocities from C¹⁷O
- Modeled ammonia line profiles with RATRAN code
- Derived infall rates of $3 - 10 \times 10^{-3} M_{\text{sun}} \text{ yr}^{-1}$



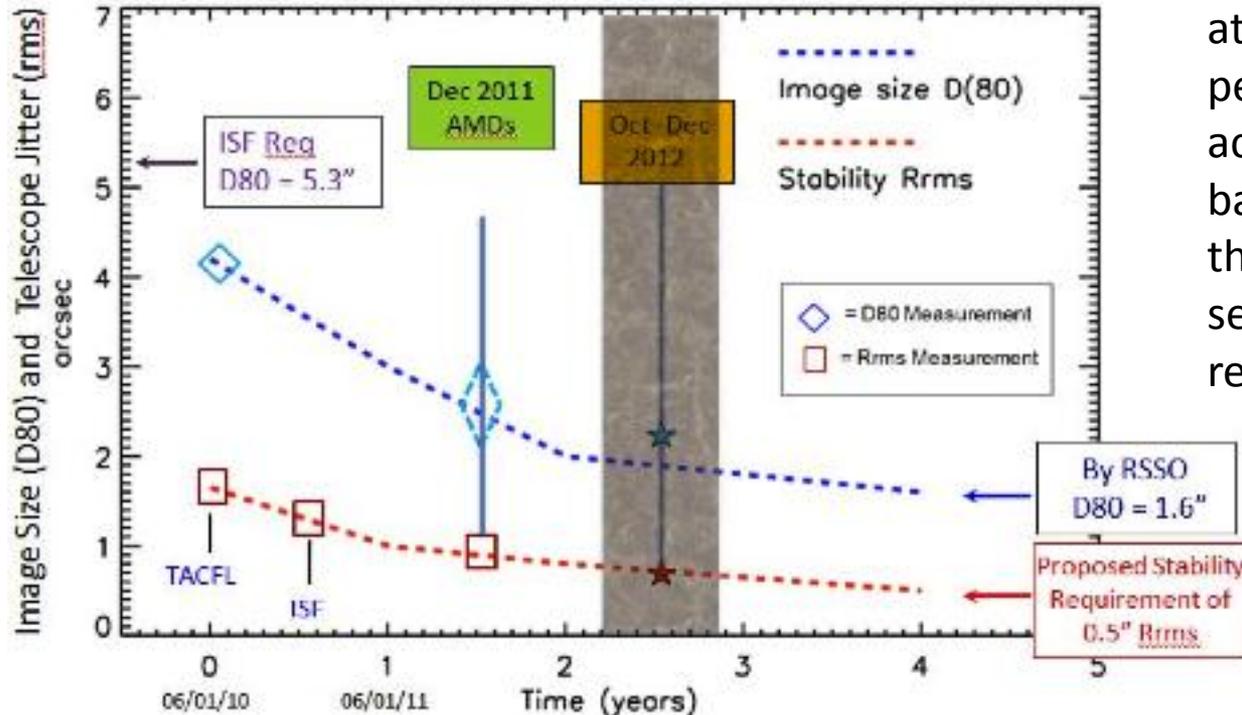
G34.26+0.15 NH₃ SOFIA and Effelsberg (Churchwell et al 1990) spectra in red compared with model

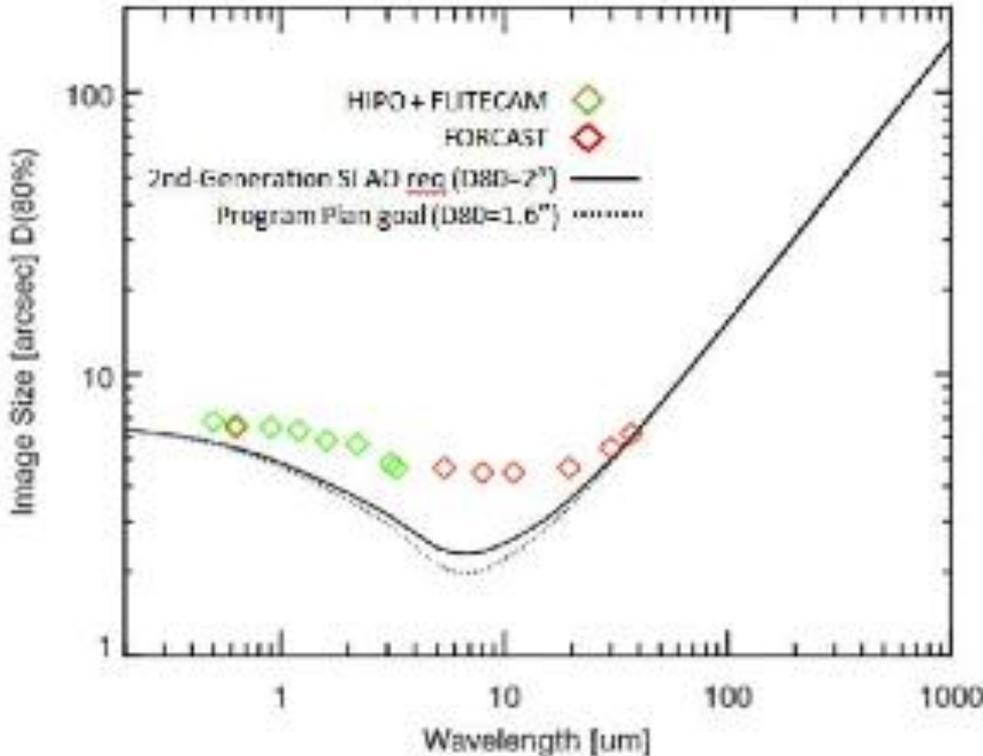
Wyrowski, et al 2012, A&A

The image quality of the SOFIA Observatory, which we describe here in terms of size and roundness of the point- spread function (PSF), is impacted by several contributing factors.

Telescope jitter is currently the dominant component of image blur, and is also primarily responsible for PSF elongation.

For this reason, jitter reduction has received significant attention in Observatory performance improvement activities such as the AMD and baffle plate work described in the previous section. However, several other contributors remain.





Total image size, including diffraction and anticipated jitter and shear layer seeing, as a function of wavelength.

- **HIPO and FLITECAM image sizes:**
- SCAI flights show the evidence for the wavelength dependence of Shear Layer and Cavity Seeing
- There is a clear trend that shorter wavelengths have larger image size.
- The effect can be seen in individual images
- The 1.25 image is larger and rounder
- The 3.6 image is sharper and elongated in the cross elevation direction (90 Hz spider motion)

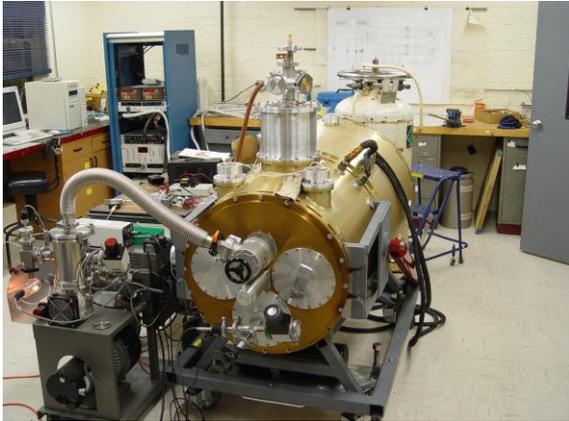
SOFIA Instrument Talks

- New instrumentation for SOFIA, Erick T. Young and Johannes Staguhn
- The FORCAST mid-infrared facility instrument and in-flight performance on - SOFIA, Joseph D. Adams
- FIFI-LS for the post Herschel era - Sebastian Colditz
- HIPO in-flight performance aboard SOFIA, Ted Dunham
- FLITECAM: current status and results from observatory verification flights - Ian S. McLean
- Preflight performance of the Echelon-Cross-Echelle spectrograph for SOFIA - Curtis DeWitt
- NIMBUS: A Near-infrared Multi-Band Ultraprecise Spectroimager for SOFIA - Michael W. McElwain
- Development of a 4.7-THz frontend for the GREAT heterodyne spectrometer on SOFIA, Heiko Richter

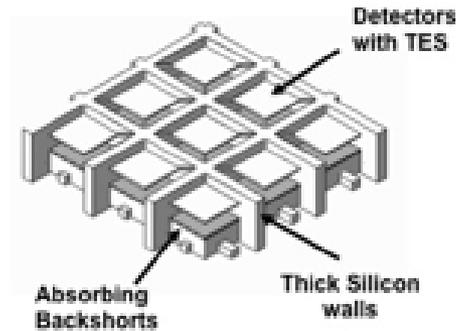
HAWC Upgrade Team

- HAWC+ is the result of two proposals selected by NASA (SOFIA 2nd Generation Instrument Investigations):
 - “SOFIA Far-IR Polarimetry with the HAWC-Pol Upgrade” (Dowell, JPL)
 - “HAWC++: Wide Field Polarimetry of FIR Dust Emission and Fine Structure Lines in the ISM” (Staguhn, JHU)
- HAWC+ partners:
 - Jet Propulsion Laboratory (Dowell): polarimeter, integration & test, P.I. & project management
 - JHU (Staguhn): detector tests & integration, control, data acquisition and analysis software
 - NASA/GSFC (Benford, Jhabvala, Chuss): detector upgrade, detector integration
 - Chicago (Harper, Berthoud): HAWC instrument, control and analysis software
 - NIST/Boulder (Irwin, Hilton): SQUID multiplexers
 - UBC (Halpern): warm readout electronics
 - Northwestern (Novak, Chapman): analysis software
 - Cornell (Stacey): narrow-band filters
 - Cardiff (Ade): Broadband filters
 - U. Illinois (Looney): cryogenic motor
 - NASA/Ames and USRA (Dotson, Vaillancourt): commissioning support
 - a multi-institution, multi-disciplinary science team covering magnetic field and grain alignment theory, FS-line polarization, star formation, and ancillary observations
- Target date for commissioning: 2015

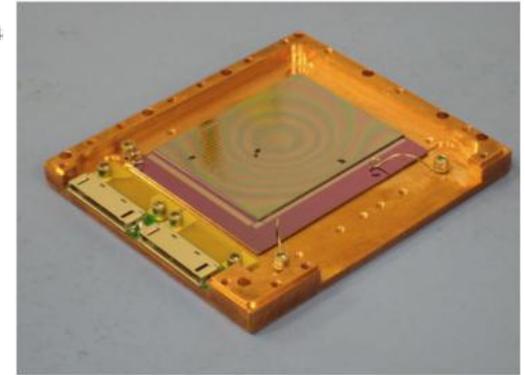
Elements of HAWC+



HAWC instrument (U. Chicago): undergoing SOFIA pre-ship review this month



two 64x40 Backshort Under Grid (BUG) TES detector arrays (GSFC, JHU): 14 times increase number of pixels & 8 times increase in field of view



polarimeter (JPL, U. Illinois): in advanced state of development; continuous and stepped rotation of quartz half-wave plates



Fabry-Perot filters (Cornell): 5 fixed-tuned filters covering [OI], [CII], [OIII], [NII] far-IR lines