

## *SIMulation Status Report*

- **SIMGAM - unchanged still at v21**
- **SIMENE - unchanged, still at v13**
- **SIMFIN**
  - **v13 (23-Jan-1997)**
    - » Uses center of module for z-location (as is done in EVP), rather than using the location-broadened value. Changes scatter vector zenith angle by as much as  $\sim 1.5^\circ$  (typically, much less).
- **SIMRSP**
  - **v1 (24-Feb-1997)**
    - » Provides for generation of ERG matrices from SEV data. BRM matrix generation not yet validated and therefore BRM option has been blocked.
- **SIMPSF**
  - **v10 (24-Jan-1997)**
    - » Scaling of IAQ/FAQ now based on the data themselves rather than some fixed scaling factor.
  - **V11 (4-Feb-1997)**
    - » If there are no events in the dataspace, IAQ/FAQ datafiles are not generated. Previous version (v10) did not handle this situation well because of the new scaling algorithm.
- **SIMSPG - unchanged, still at v3**
- **SIMSRV - unchanged, still at v3**
- **SIMTRK - obsolete**

## *SIMulation Status Report*

### *Modified Architecture of SIM Subsystem*

#### **Modified architecture will:**

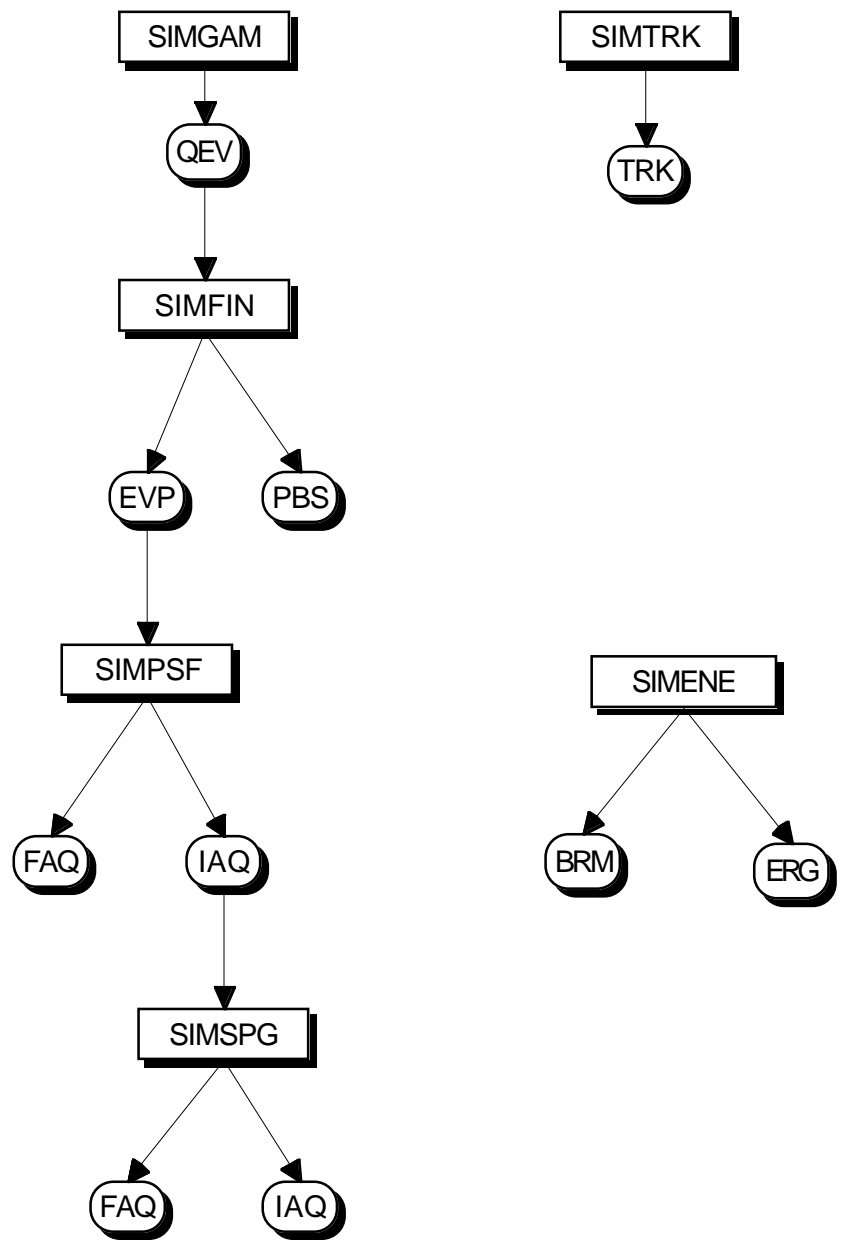
- Make more effective use of CPU time (SIMENE is presently an all-in-one task, which can require 2-3 weeks of CPU and must be repeated for each set of event selections).
- Eliminate code duplication within SIM (e.g., updates made to SIMGAM require a duplication of those updates in SIMENE/SIMTRK).
- SIMENE will be broken up into three separate steps (SIMGAM, SIMFIN, SIMRSP).
- SIMGAM will be modified to generate TRK files as an option.
- SIMFIN will generate either EVP files (for SIMPSF), PBS files (for analysis) or SEV files (for SIMRSP).

#### **Status:**

- Modified version of SIMFIN is complete.
- SIMRSP v1 is now in production. This version has validated ERG only. Validation of BRM not yet completed.
- TRK option in SIMGAM is further down the line...

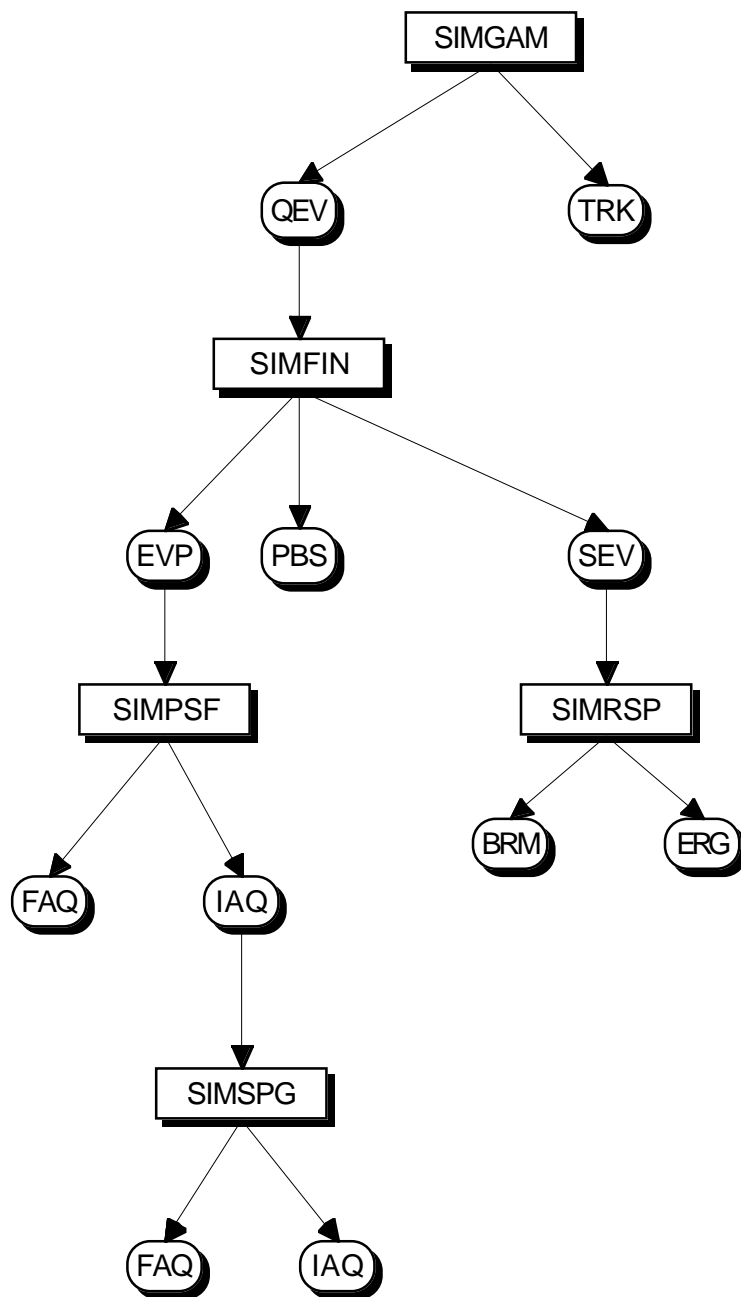
# *SIMulation Status Report*

## *Present SIM Arcitecture*



# *SIMulation Status Report*

## *Planned SIM Architecture*



## *SIMulation Status Report*

### **SIMGAM Processing**

- Standard PSF library is for 10° zenith angle. Generated using narrow incident beam, w/o secondaries.
- A complete set of narrow-beam SIMGAM jobs (beam type 1), with secondaries, for 30° and 40° is available, but not distributed. No plans to distribute unless requested.
- A complete set of wide-beam SIMGAM jobs (beam type 11), with secondaries, for 30° is available. Standard PSFs have been generated and will be distributed.
- Each set of data (one zenith angle) requires ~4-5 months effort on 2 CPUs.
- Presently working on 40° data (wide incident beam).
- Following the completion of the 40° data, we will proceed with PSF library generation for 20° and 10°.
- PSFs from direct simulations are now quite old (latest generated in August of 1995). Should be used with care, especially for high energies and large zenith angles.

**Remember! The new SIMGAM modifications are expected to be most significant (~10%) at high energies and large zenith angles. We felt it was not critically important to replace the 10° data.**

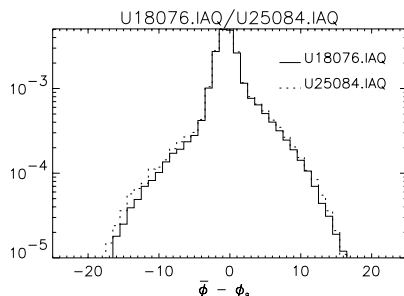
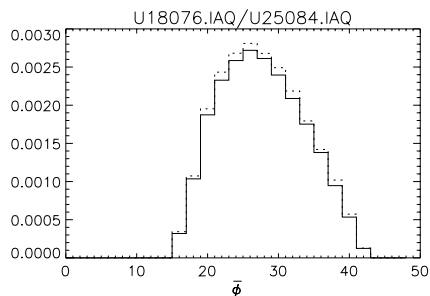
## *Simulation Reports*

Several documents are now available to document the status of the SIM processing:

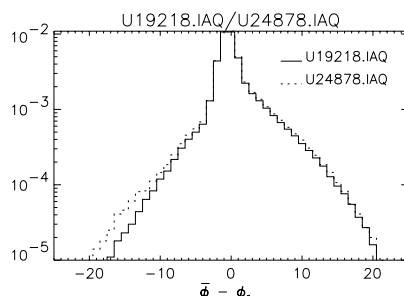
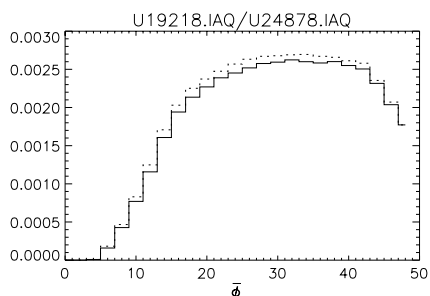
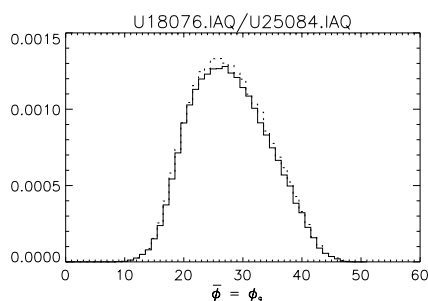
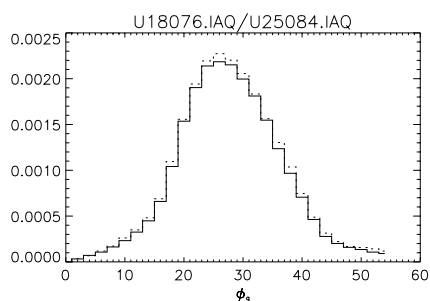
- COM-RP-UNH-SIM-050 (26-Feb-1997)  
*Summary of Directly-Simulated PSFs*
  - » Calibration PSFs
  - » Wien PSFs
  - » Power-Law Spectra with Standard Configuration
  - » Power-Law Spectra with VP 2.5 Ratio Cuts
  - » Spectral Lines for Specific Observations
  
- COM-RP-UNH-SIM-051 (26-Feb-1997)  
*PSF Library Simulations at 10° Zenith Angle (Narrow Beam)*
  - » QEV-EVP Processing (SIMGAM-SIMFIN)
  - » Monoenergetic PSF Libraries (SIMPSF)
  - » Synthesized PSFs (SIMSPG)
  
- COM-RP-UNH-SIM-052 (26-Feb-1997)  
*PSF Library Simulations at 30° Zenith Angle (Narrow Beam)*
  - » QEV-EVP Processing (SIMGAM-SIMFIN)
  - » Monoenergetic PSF Libraries (SIMPSF)
  - » Synthesized PSFs (SIMSPG)
  
- COM-RP-UNH-SIM-053 (26-Feb-1997)  
*PSF Library Simulations at 40° Zenith Angle (Narrow Beam)*
  - » QEV-EVP Processing (SIMGAM-SIMFIN)
  - » Monoenergetic PSF Libraries (SIMPSF)
  - » Synthesized PSFs (SIMSPG)
  
- COM-RP-UNH-SIM-054 (26-Feb-1997)  
*PSF Library Simulations at 30° Zenith Angle (Wide Beam)*
  - » QEV-EVP Processing (SIMGAM-SIMFIN)
  - » Monoenergetic PSF Libraries (SIMPSF)
  - » Synthesized PSFs (SIMSPG)

# *Narrow vs. Wide Incident Beam*

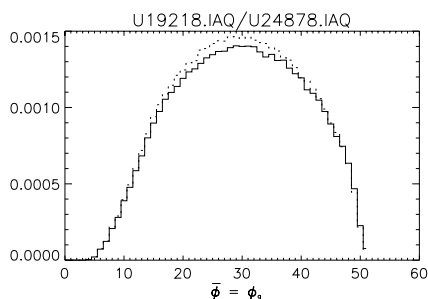
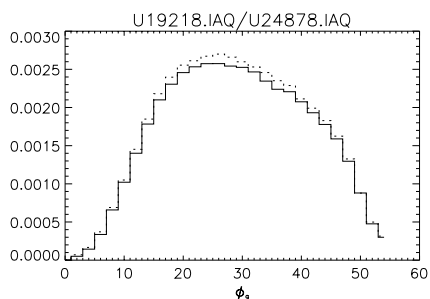
Comparisons at 30° incident angle



0.75-1.0 MeV  
18076 - narrow  
25084 - wide



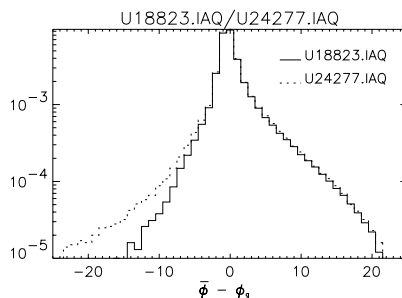
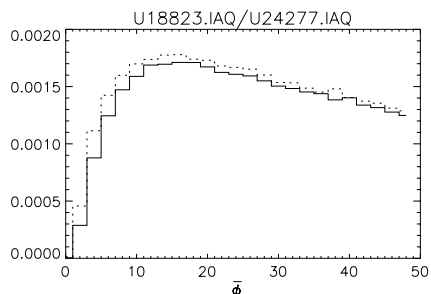
1.0-3.0 MeV  
19218 - narrow  
24878 - wide



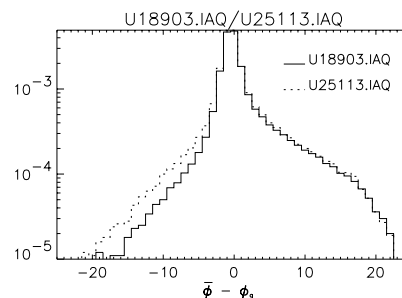
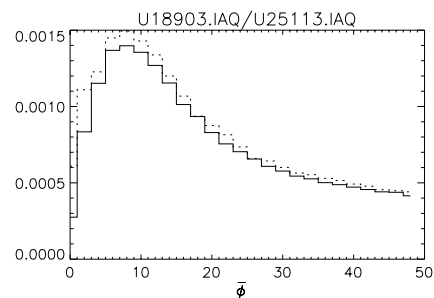
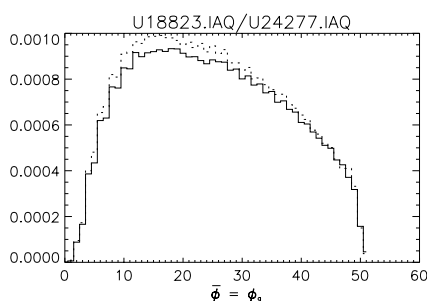
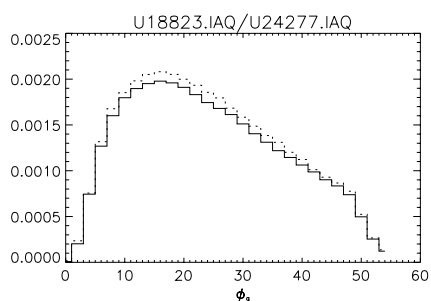
Results with wide incident beam show higher efficiencies.

# *Narrow vs. Wide Incident Beam*

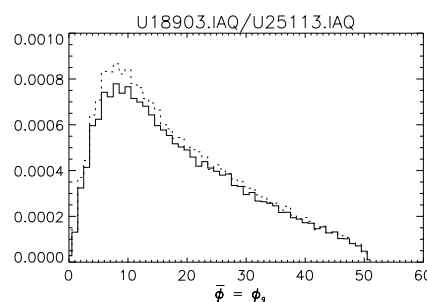
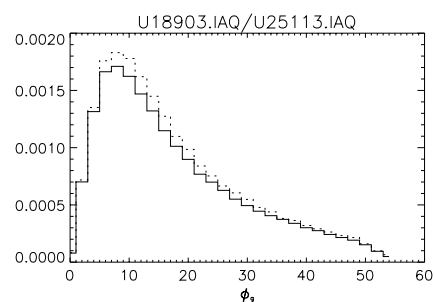
Comparisons at 30° incident angle



3-10 MeV  
18823 - narrow  
24277 - wide



10-30 MeV  
18903 - narrow  
25113 - wide

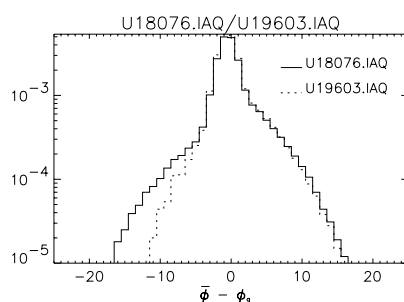
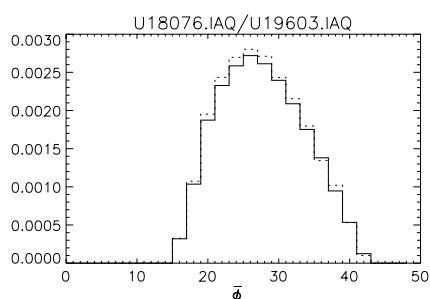


Results with wide incident beam show higher efficiencies.

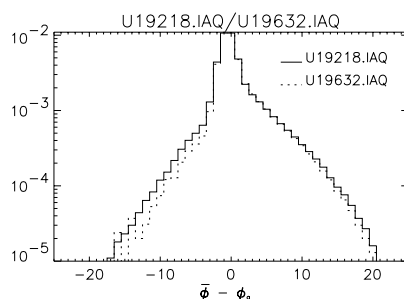
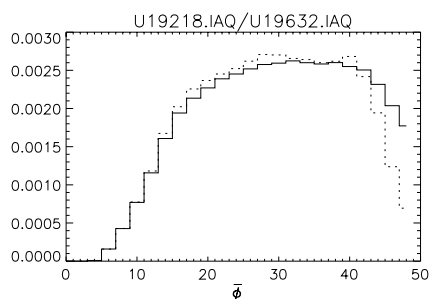
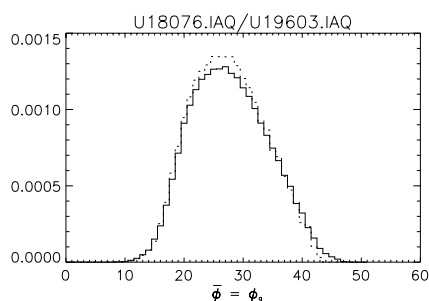
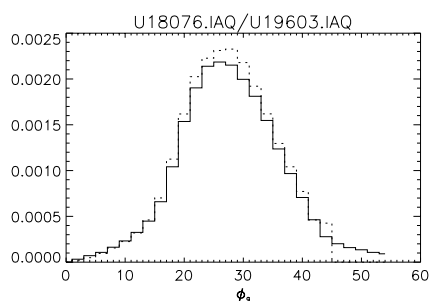


## *10° vs 30° narrow incident beam*

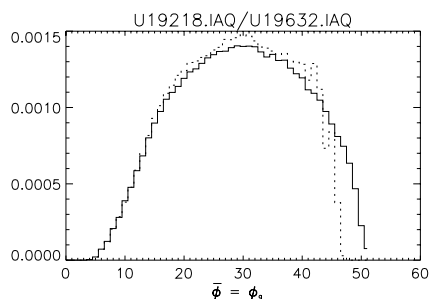
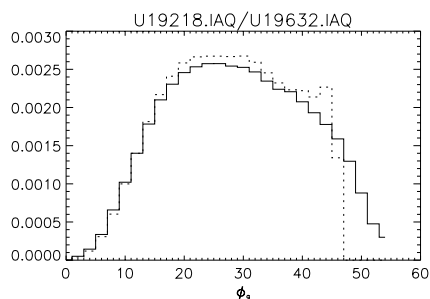
Comparison here complicated by use of different SIMGAM versions, but we expect this to have relatively small impact on 10° results.



0.75-1.0 MeV  
18076 - 30°  
19603 - 10°

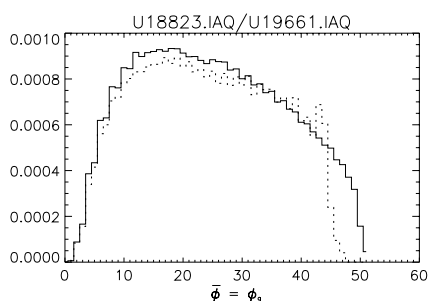
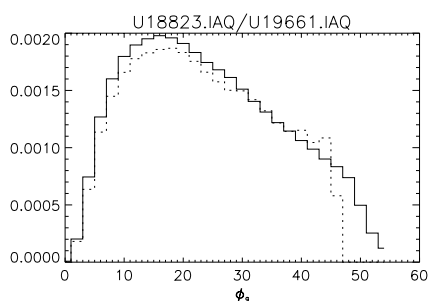
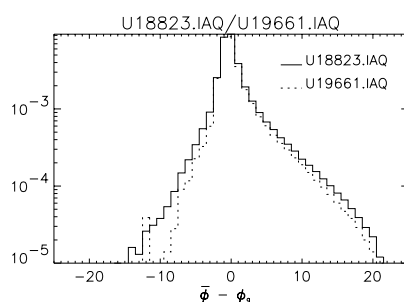
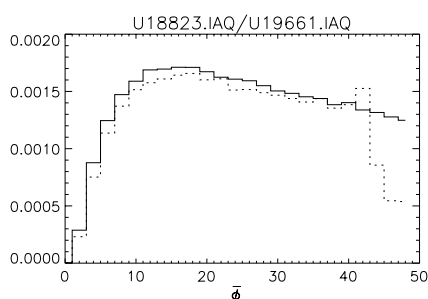


1-3 MeV  
19218 - 30°  
19632 - 10°

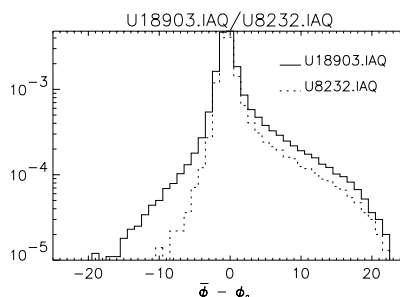
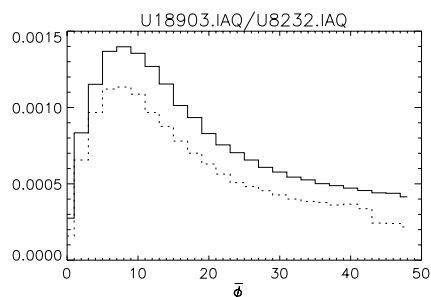


## *10° vs 30° narrow incident beam*

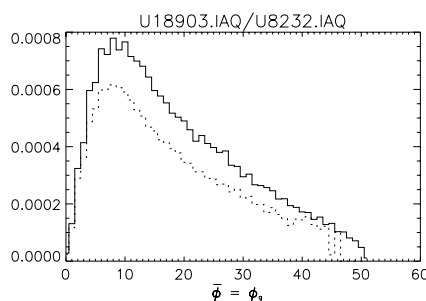
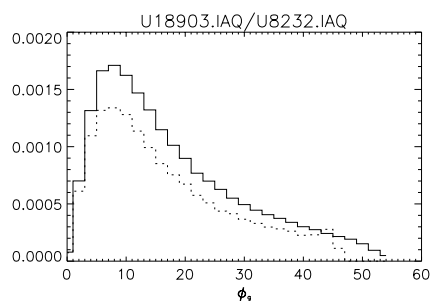
Comparison here complicated by use of different SIMGAM versions, but we expect this to have relatively small impact on 10° results.



3-10 MeV  
18823 - 30°  
19661 - 10°



10-30 MeV  
18903 - 30°  
8232 - 10°



## *SIMulation Status Report*

### *FUTURE ACTIONS*

- Complete new SIM subsystem architecture (SIMRSP).
- Generate QEV, PSF libraries for 40°, 20°, 10° zenith.
- Clarify the SIM-calibration comparison (report).
- Investigate the development of more flexible IAQ libraries for use in SIMSPG (presently limited to power-laws).
- Define an algorithm for smoothing PSFs at high phibar (?).
- Investigate the incorporation of a more realistic event location distribution into SIMFIN. (Is this necessary?)
- Investigate the feasibility of some angle-averaged PSF for use in combined observations.
- Incorporate use of new PSD selection (60-90)?
- Incorporate latest ToF corrections (from RvD)? Although these corrections are not (yet?) universally used.
- Define simulation requirements for line analysis.