South Pole Air Shower Experiment

30 stations on a 30 m triangular grid
4 scintillator modules per station
Goals

1. Cosmic Ray Physics
   - Energy spectrum
   - Composition
   - Ratio of $\gamma$-rays to cosmic rays
   - Anisotropy (SPASE only)
   - ...

2. AMANDA Calibration
   - Mapping AMANDA OMs
   - Ice properties (relative light attenuation)
   - ...

Study with SPASE II and AMANDA II data
Possible improvement in AMANDA calibration
Coincident Events

75 days of 2002 data
20 days of 2003 data

E: primary CR energy
S30: particle density @ 30m from shower core

Deficit of high energy events in 2002

Log(S30) ∝ Log(E)
Combined Reconstruction

Cuts

R < 60m
S(30) > 5m$^{-2}$
Cylinder Size < 1
Event Matching

AMANDA

SPASE

$\Delta T = T_{amanda} - T_{spase} \text{ (sec)}$

2002 day 112

2003 day 176

Asymmetry!

No event triggered within +/- 5 ms !!!
2003 matched data

SPASE trigger rate: ~4 HZ ~20% of AMANDA dead time
### New SPASE Simulation

<table>
<thead>
<tr>
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<th>Old</th>
<th>New</th>
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<tbody>
<tr>
<td>Shower Generator</td>
<td>MOCCA</td>
<td>CORSIKA</td>
</tr>
<tr>
<td>Detector Simulation</td>
<td>-</td>
<td>GEANT4</td>
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<tr>
<td>Snow Effect</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
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Muon threshold energy = 300 MeV
Z of muons at surface = 1695 m (instead of 1727.91 m)

CORSIKA events have been generated at Bartol and Madison.
(H, He, C, O, Fe, and γ over 0.5 – 5000 TeV)
Summary & Prospect

- More reliable SPASE simulation program with CORSIKA is available.

- The new SPASE simulation data successfully ran through Simuperl (mmc, amasim), but needs to be checked carefully.

- The combined reconstruction will be implemented into Sieglinde.

- Hopefully show some results at the next collaboration meeting.