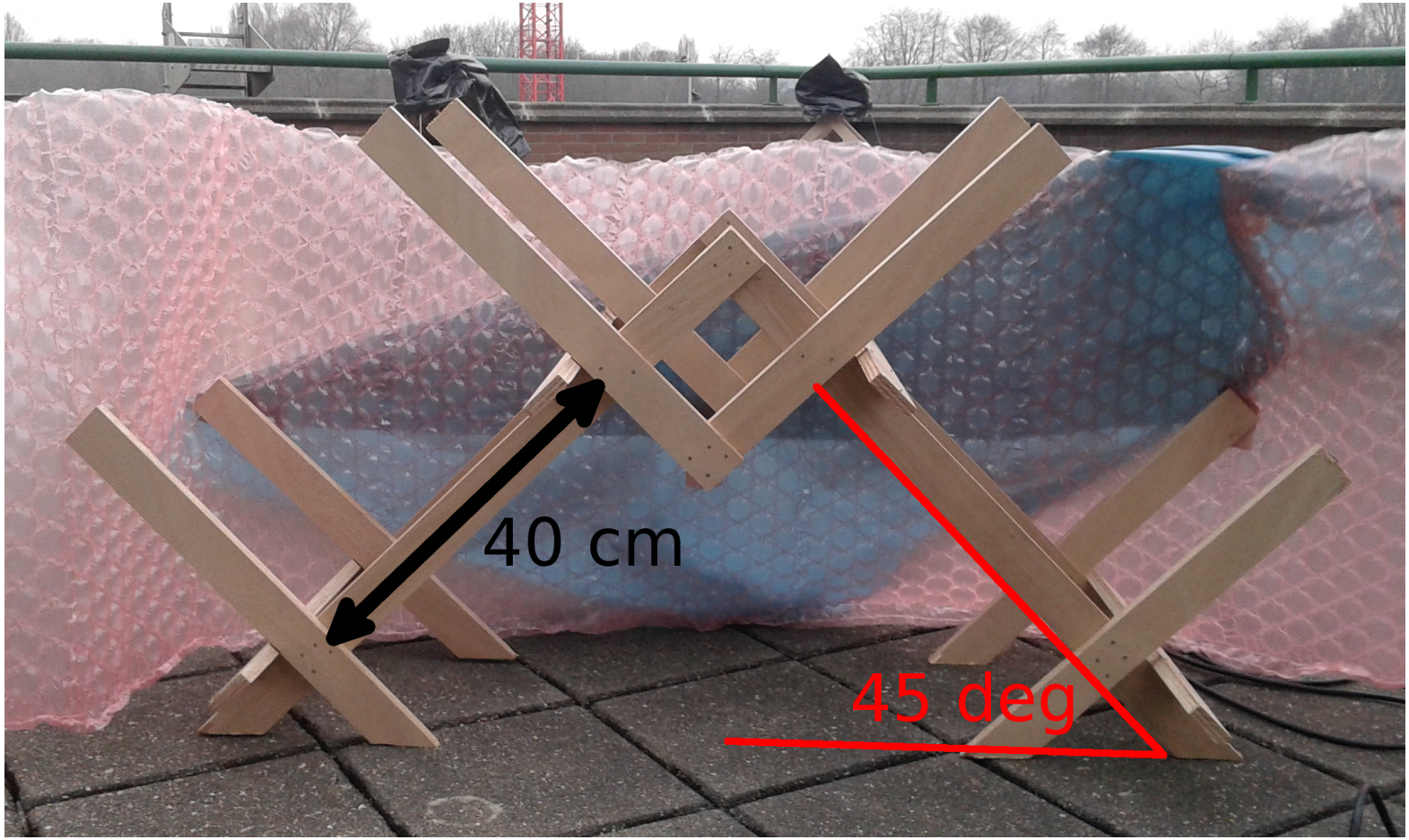
IGLOO – **I**ncoming **G**alactic **L**eptonic **O**bject **O**bservatory (Upgrade of the Wine Rack Experiment)

Laura, Lucrezia, Monika, Sander

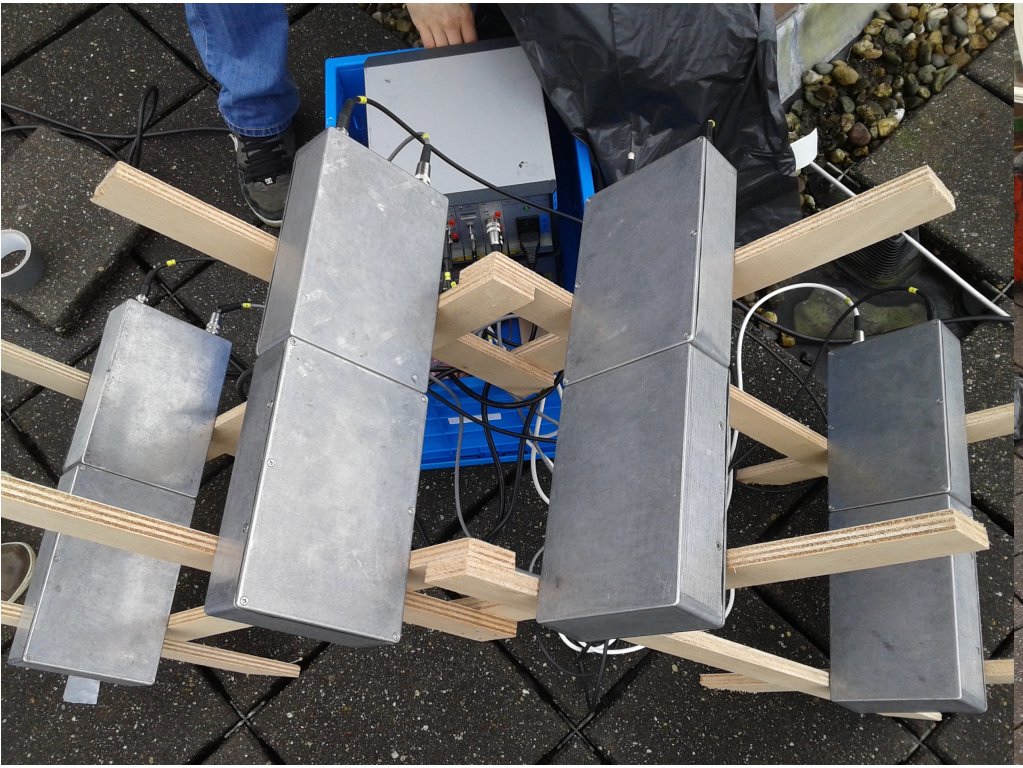
25th March 2015

Setup



Acceptance angle: $\pm 22.36^\circ \pm 0.75^\circ$

Upgrade



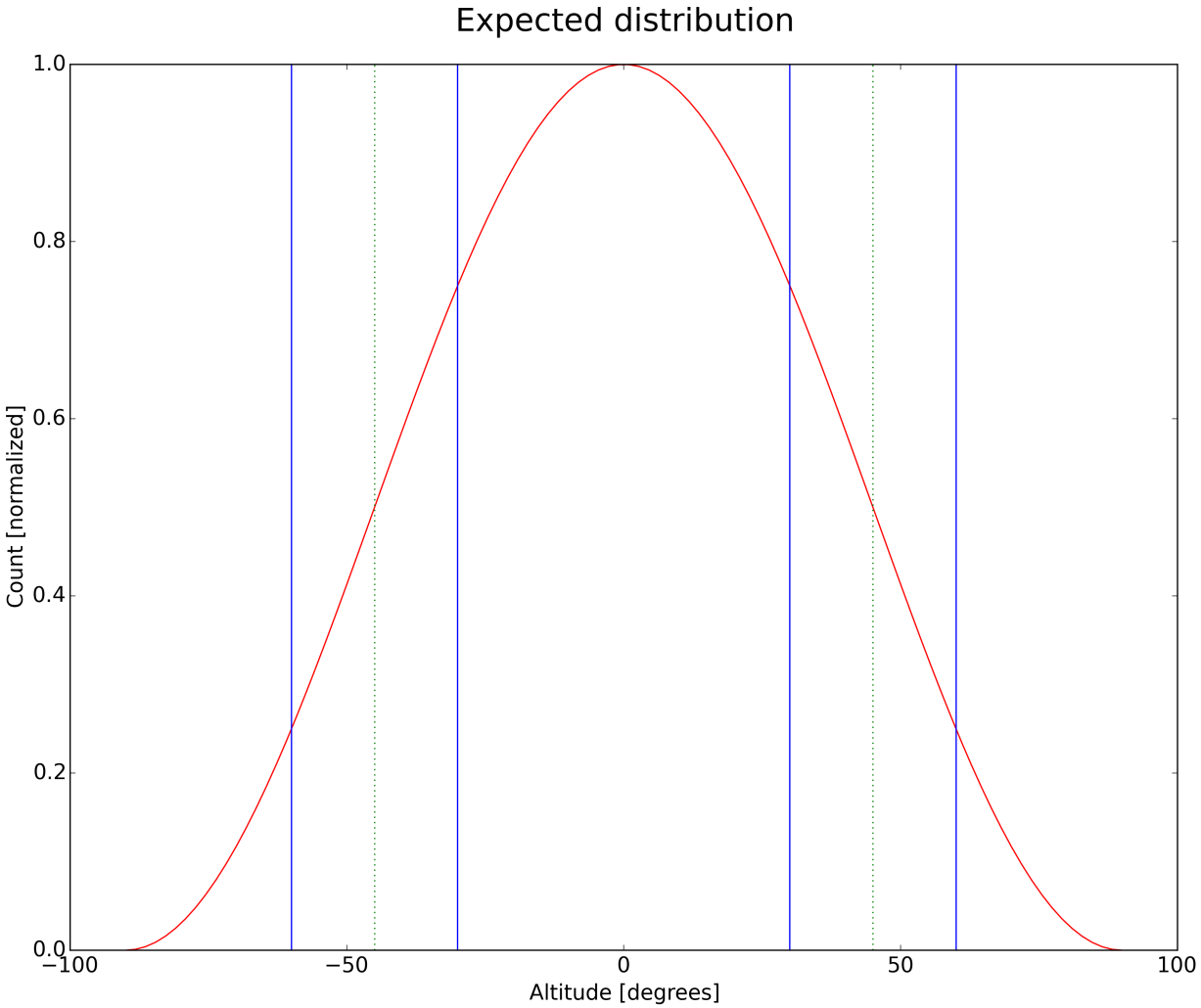
Measurement

- **Calibration:**
  ∼40 minutes
  7699 and 8238 counts
  Detector pairs on top of each other
- **Data measurement:**
  ∼90 minutes
  9928 and 804 counts
  Detector 40 cm apart

Counter was replaced
↓
problem unsolved
↓
found two broken counters

- **Calibration:**
  ∼42 minutes
  6448 and 6425 counts
  Detector pairs on top of each other
- **Measurement inside during the night:**
  ∼900 minutes
  West: 6658 counts
  East: 6980 counts
- **Measurement outside during the day:**
  ∼238 minutes
  West: 2205 counts
  East: 2022 counts
  ∼159 minutes
  West: 1333 counts
  East: 1353 counts

Expected results



distribution.png

Errors:

Statistical:

- Timing: 1 min
- Counts: $\sqrt{N}$

Systematic:

- Error on the three angles in the setup $\longrightarrow$ one is significant
- Efficiency: corrected for
- Position (difference distance between the two detector pairs) only for night measurement
- Building only for night measurement

Results from the day measurement

- Rotated setup with similar measuring times
- R : rate

$$assym = \left(\frac{R_{E1} - R_{W1}}{R_{E1} + R_{W1}} + \frac{R_{E2} - R_{W2}}{R_{E2} + R_{W2}} \right) /2$$

- $assym = 0.58 \pm 3.02\% \longrightarrow$ no significant difference
- Calculate $p - value = 0.21$
  $\longrightarrow$ 21% of time you get our found asymmetry or a higher value with the hypothesis of no asymmetry

Results from the night measurement

- One measurement $\longrightarrow$ no correction for position errors
- Corrected for efficiency from the calibration run
- $assym = 2.97 \pm 1.70$ counts $\longrightarrow 2\sigma \longrightarrow$ significant result ($p - value = 0.015$)
- Access coming from the east $\longrightarrow$ negative particles

Conclusion

- No significant difference between positive and negative particles from the day measurement
- Significant difference from night measurement (only taking into account statistical errors)
- No significant difference within systematic errors
- **Was great fun and great experience!**