THU2 cosmic test results

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<table>
<thead>
<tr>
<th>Material</th>
<th>THU #1</th>
<th>THU #2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead plate</td>
<td>Beijing, China</td>
<td></td>
</tr>
<tr>
<td>Reflective materials (WLS fiber)</td>
<td>Silver ink from Italy (THU1 isn’t polished very well)</td>
<td></td>
</tr>
<tr>
<td>Scintillator plate</td>
<td>Kedi #1</td>
<td>Kedi #2</td>
</tr>
<tr>
<td>Reflective materials (between scin and lead)</td>
<td>Sliver paper (Mirror reflection)</td>
<td>Powder painting (Diffuse reflection)</td>
</tr>
<tr>
<td>Reflective materials (outside of the ECal)</td>
<td>TiO$_2$</td>
<td>Tyvek (will be replaced with TiO$_2$)</td>
</tr>
<tr>
<td>WLS fiber</td>
<td>Kurrary Y11</td>
<td>Saint Gobain BCF91A</td>
</tr>
</tbody>
</table>

Top of the WLS fiber (connect to the PMT)  
End of the WLS fiber (mirror painting)
Cosmic test

Schematic diagram of cosmic ray experiment setup
■ *Horizontal cosmic test*

- Data taking system
- Ecal
- Trigger

**cosmic ray test setup**
Gain of PMT1 (1100V)

\[ \text{Gain} = \frac{\text{Peak}_2 - \text{Peak}_1}{R \cdot e} = 4.2 \times 10^6 \]
Horizontal cosmic test

\[ N_{pe} = \frac{(X - \text{ped}) \times 10^{-12}}{1.6 \times 10^{-19} \times 0.42 \times 10^{-7}} \]

Npe 232
**Horizontal cosmic test**  
(*Calibration of attenuation*)

\[
N_{pe} = \frac{(X - \text{ped}) \times 10^{-12}}{(1.6 \times 10^{-19} \times 0.42 \times 10^{-7})}
\]

The amount of signal charge will exceed the ADC's range when vertical testing, so we need to use the attenuator. This test is for Calibration of attenuation.

\[
time of attenuation = \frac{232}{24.6} = 9.4
\]
vertical cosmic test

\[ Npe = \frac{(X_{ped}) \times 10^{-12} \times 9.4}{(1.6 \times 10^{-19} \times 0.42 \times 10^{-7})} \]

- We will continue the vertical test to get more events
- We will replace Tevek with TiO\textsubscript{2} and the performance will be better than 673