PET Emulator

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Outline

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- Methods
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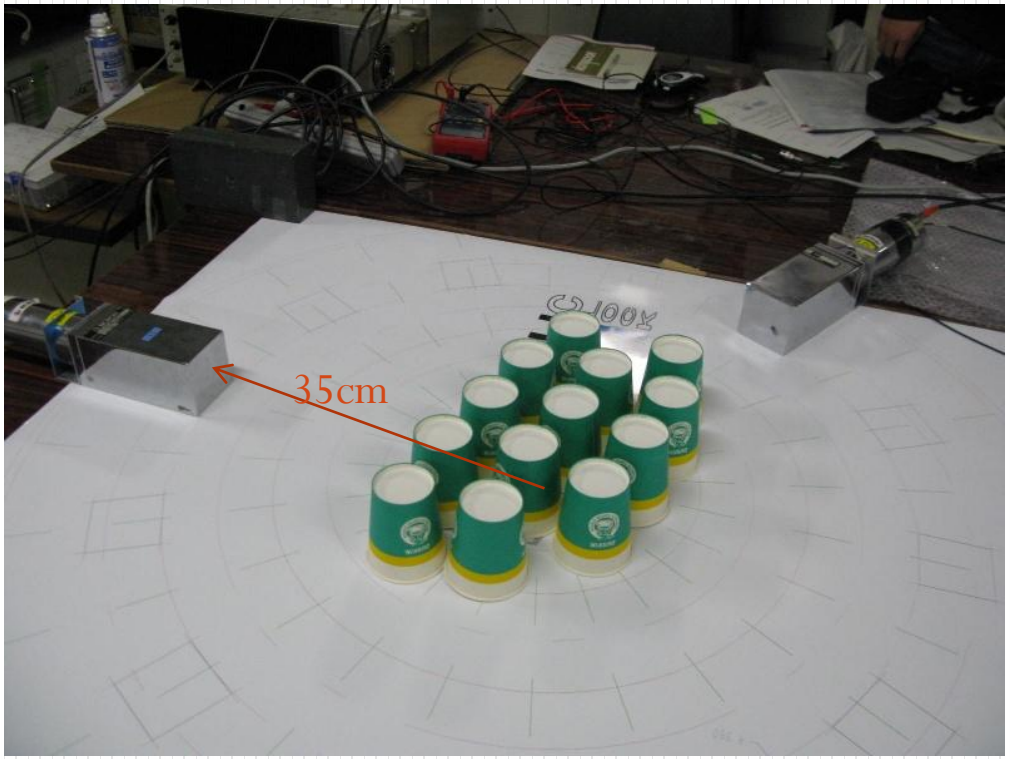
- Summary & Future Improvement

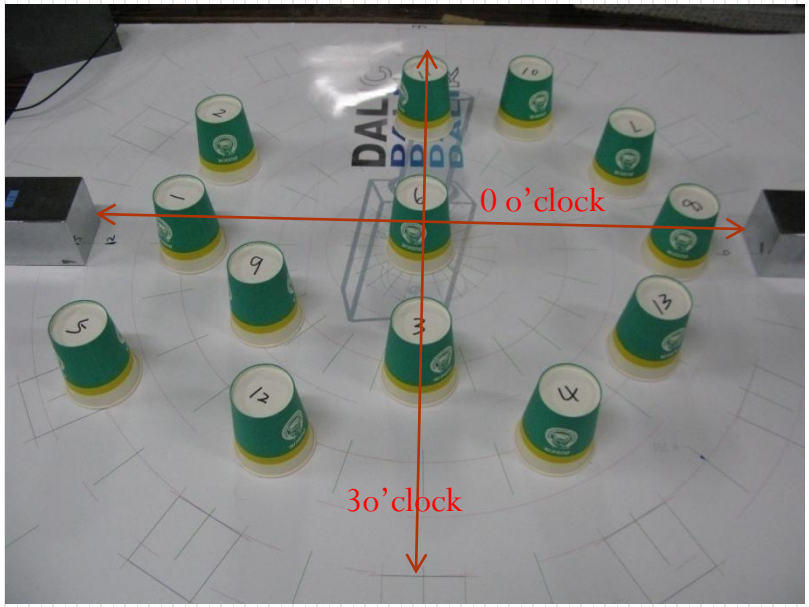
Overview

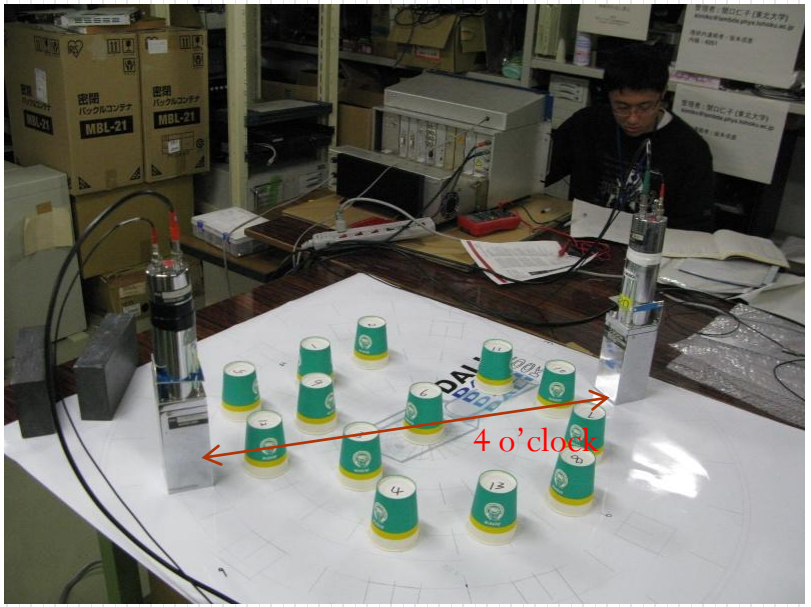
- Goal: find the γ source(Na-22) in a 35cm-radius circular area.
- Na-22:emit pairs of γ rays in opposite direction ,each energy is 511keV
- 13 cups, only one has a source inside



Methods

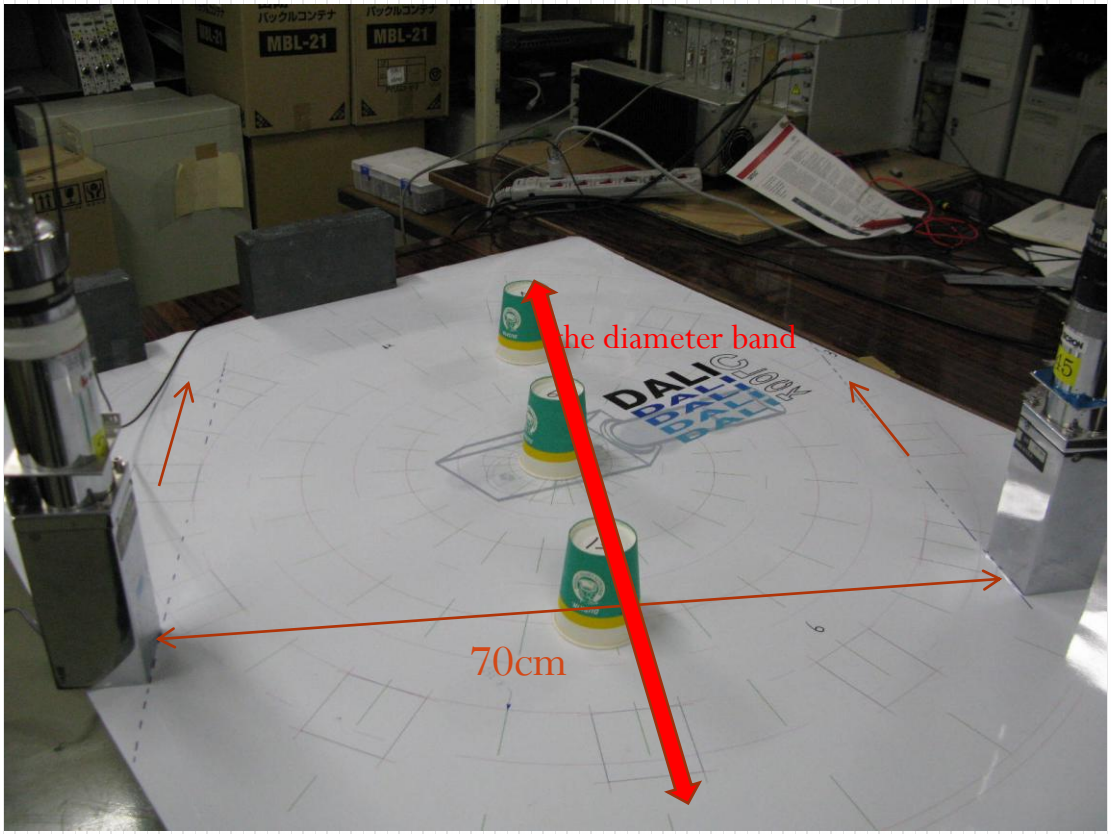
- First step, number the cups:No1-No13
- Second step, use two NaI(Tl) detectors to make a coincidence in different directions. Find the source in a clock direction





Methods

- Third step, the source lies on a known diameter band. Move the two scintillators around the band, finally find the source.



Results

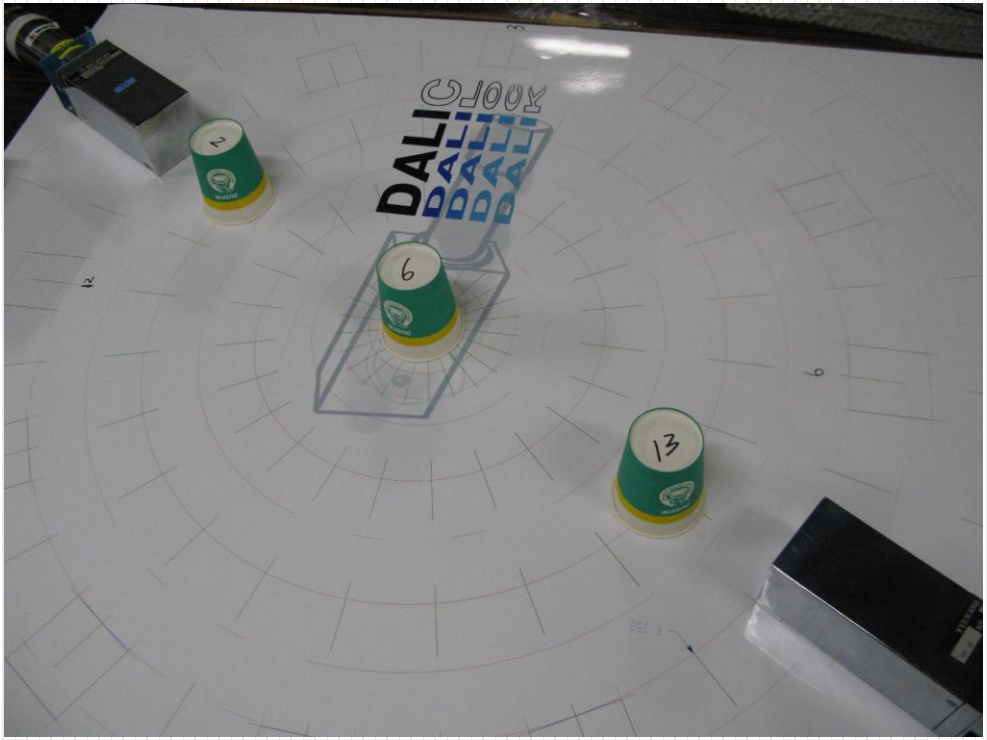
- Coincidence counts in different directions per second

Direction	Counts/sec
0 o'clock	1.144
1 o'clock	40.089
2 o'clock	1.189
3 o'clock	0.578
4 o'clock	0.633
5 o'clock	0.722

- The source is in 1 o'clock direction band

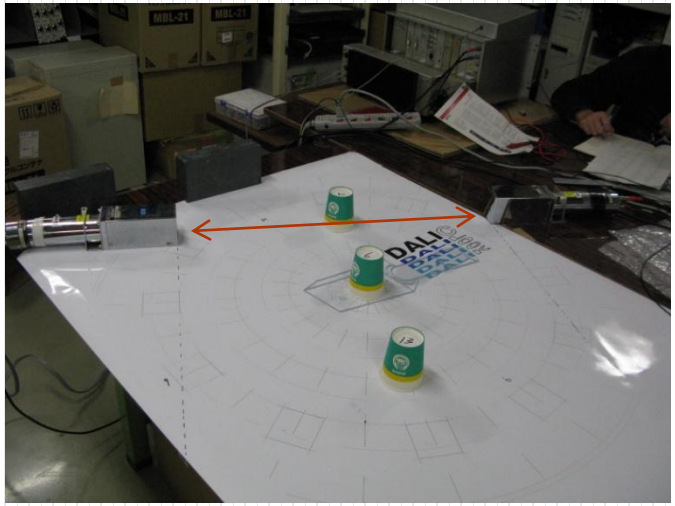
Results

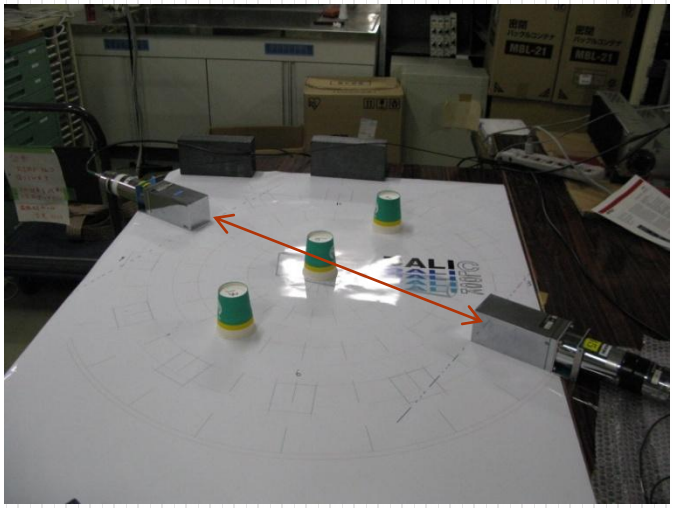
- 3 cups left:No.2,No.6 and No.13

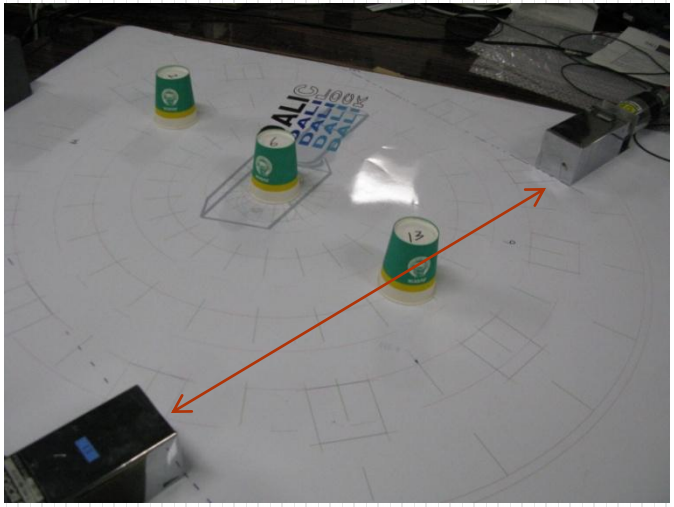


Results

- Move the scintillators step by step





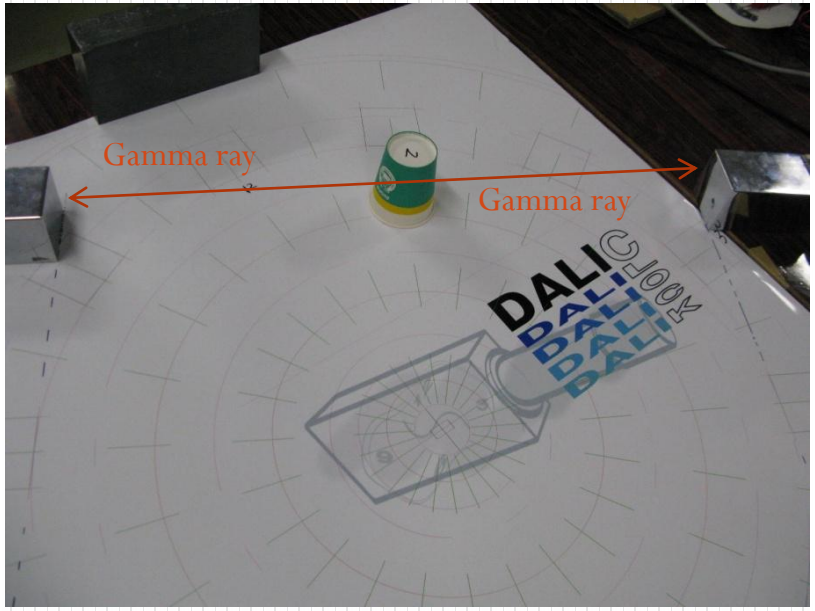


Results

- Coincidence counts in different directions per second

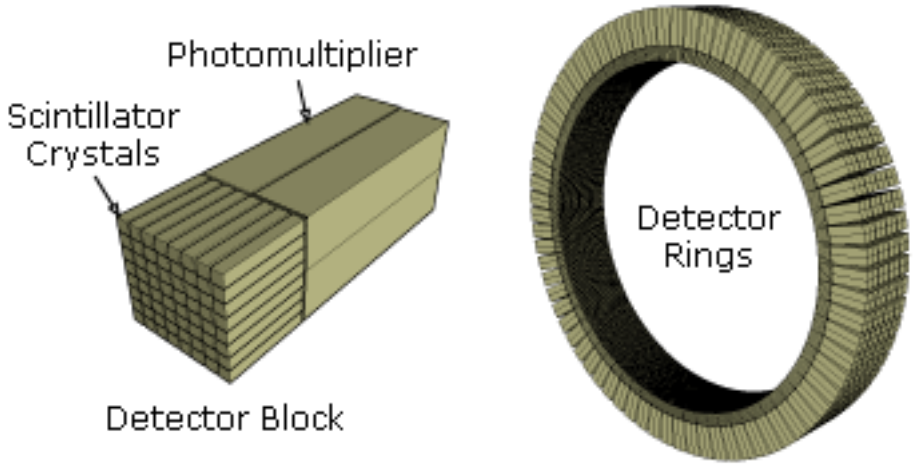
Direction	Counts/sec
No.2cup	31.467
No.6cup	0.733
No.13cup	0.244

- The source is in No.2 cup



Summary & Future Improvement

- The effective target area and angular resolution of scintillator determine the precision of our experiment
- If there are more cups, more detectors are needed.
- If we put scintillators in each directions, we can detect the coincidence signals at the same time
- 3-dimensional and 4-dimensional(the 4th dimension being time)PET.



Copied from http://en.wikipedia.org/wiki/positron_emission_tomography

- Thanks to Mr. Wata-nabe Yasushi for the guide and help
- Copartners:徐子骏 鸦梅林 彭星宇