

NMIS FLOOR REFLECTION EFFECT ELIMINATION WITH A DT GENERATOR

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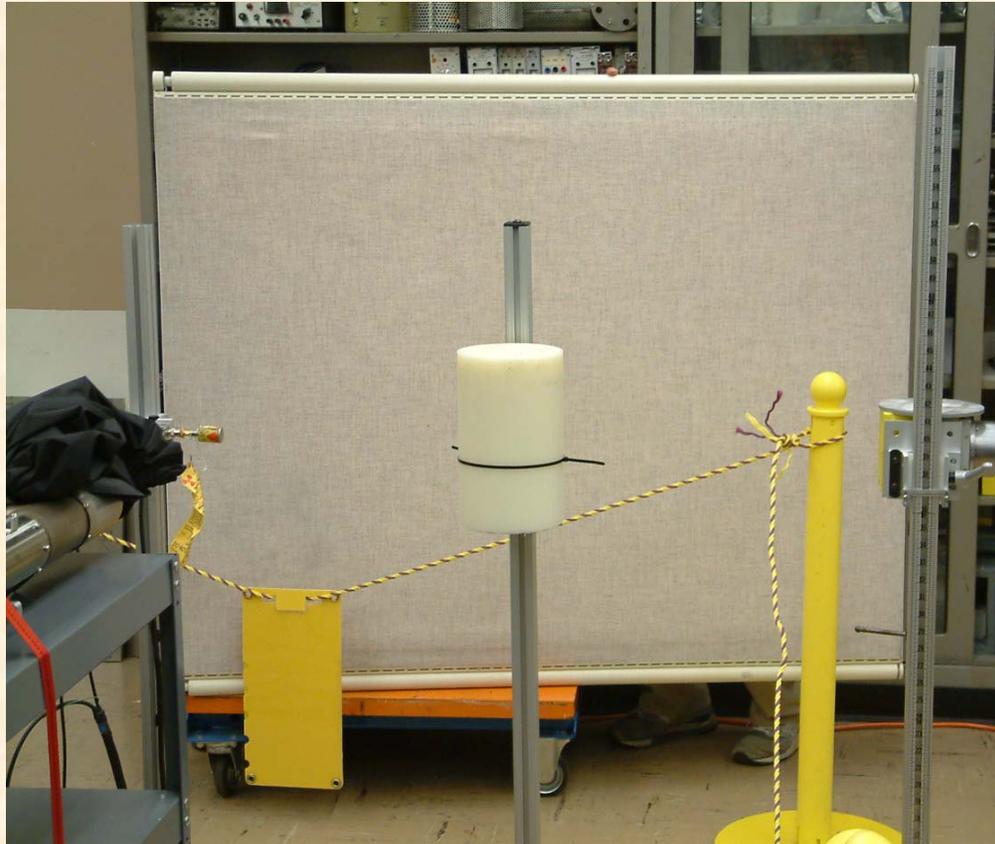
Central Chapter INMM Meeting

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- **Emission from Time Tagged Cf source is Isotropic**
- **This Results in Time Correlated Floor Reflected Contribution to NMIS Signatures**
- **These Floor Reflection Contribution are Mixed With the Fission Induced Signals**
- **Alpha Particle Time Tagging of DT Generator Neutrons Results in Directional Cone of Neutrons That can be Aimed at the Target Items**
- **Floor Reflector is Random in Time and can be Eliminated.**

Measurements Performed to Demonstrate This Elimination of Floor Reflector

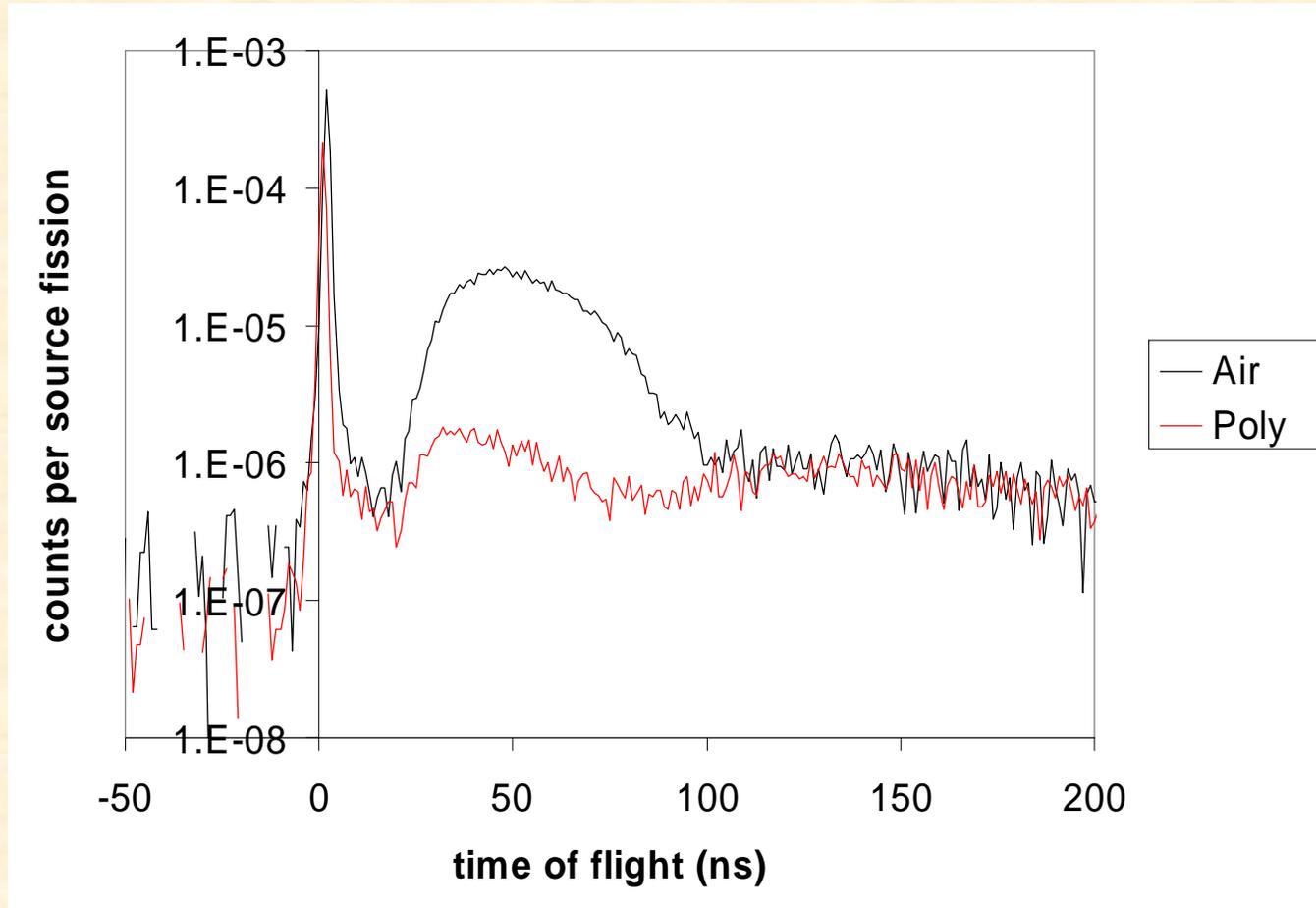
- **Time of Flight in Air with Cf Source**
- **Time of Flight with Cf with Polyethylene Between Source and Detector**
- **Time of Flight in Air with DT Generator**
- **Time of Flight with Polyethylene Between DT Generator and Detector**



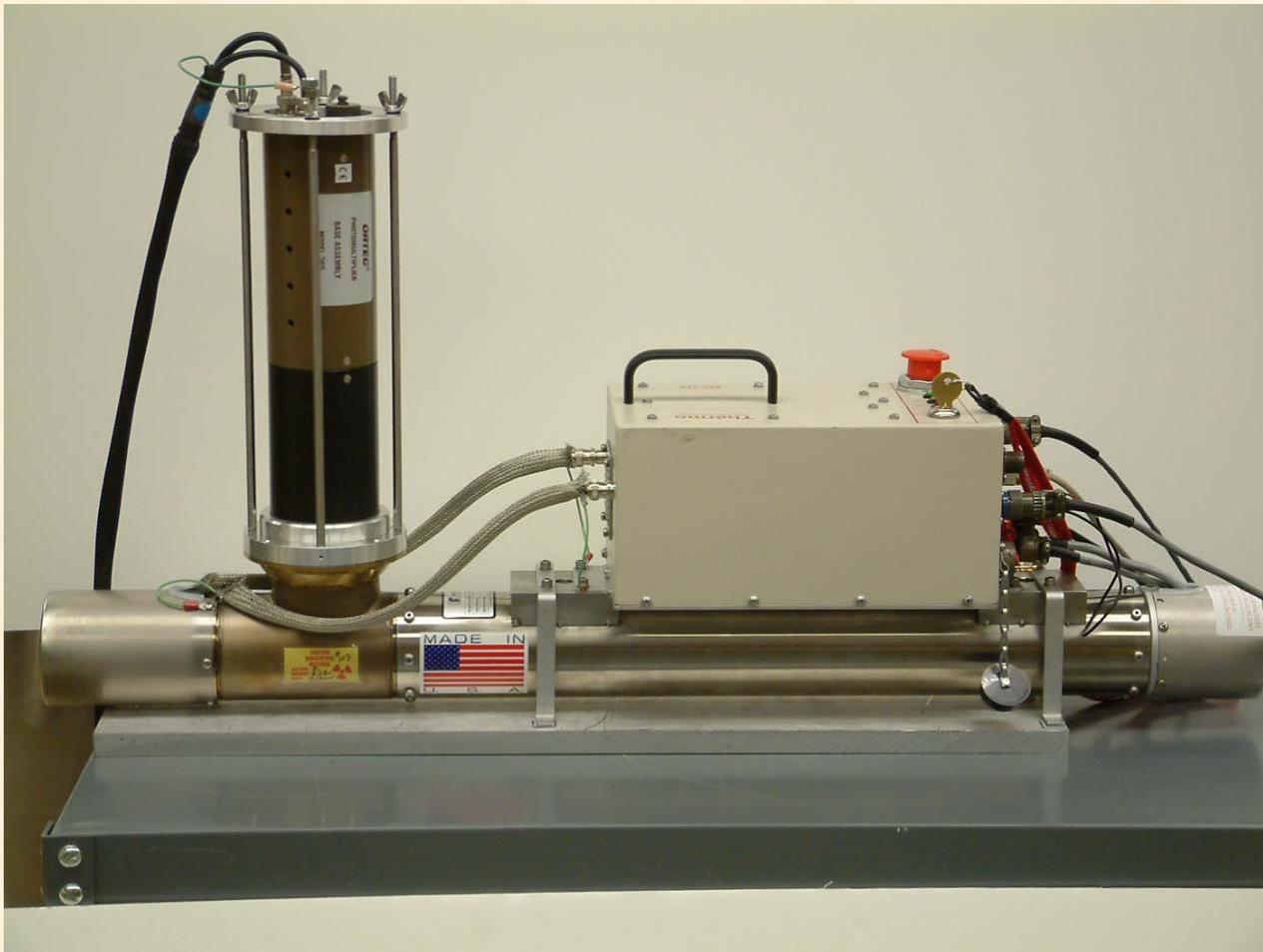
Cf Source-Sample-Detector Configuration for a Time of Flight Transmission Measurement Through Polyethylene

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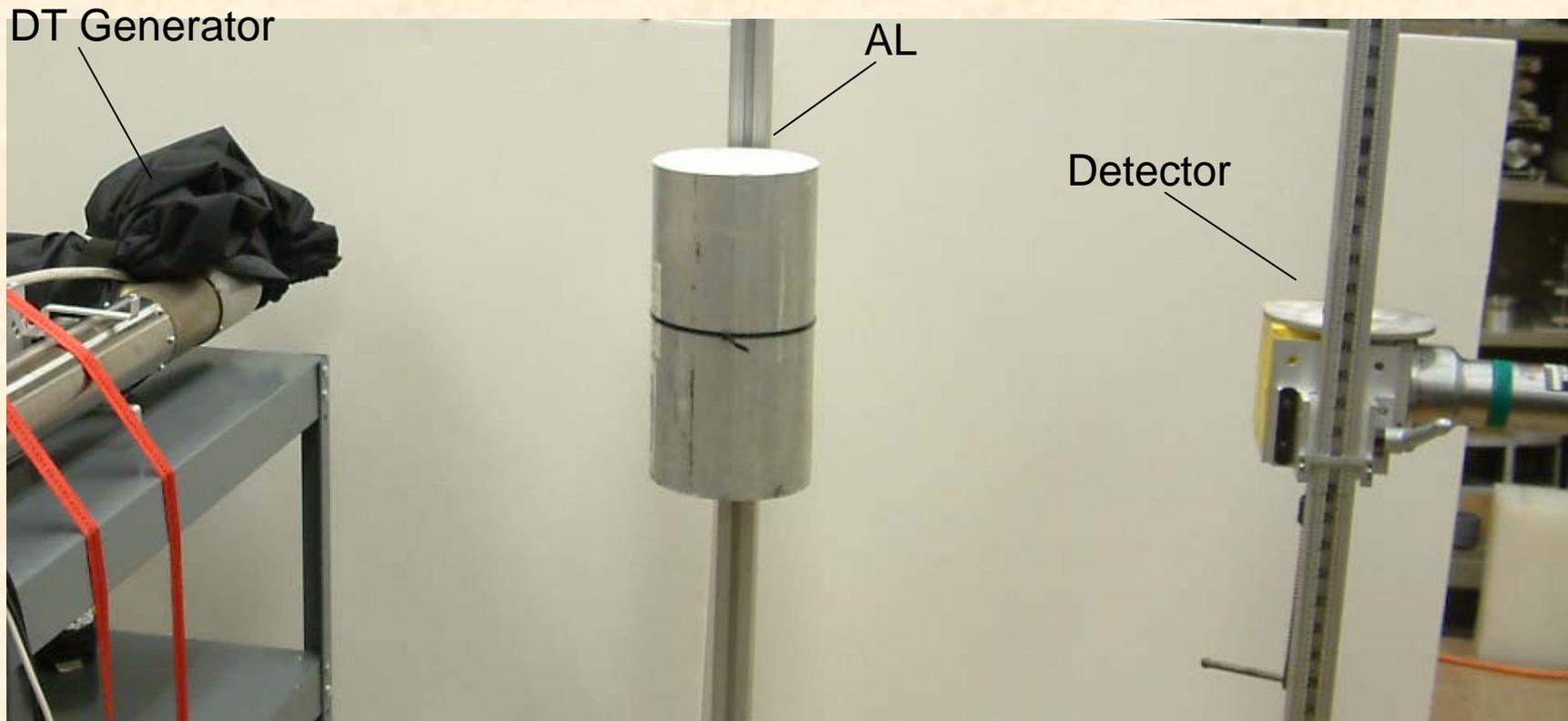
Comparison of Time-of-Flight Transmission Data with a Cf Source for the Polyethylene Cylinder to Measurements in Air.



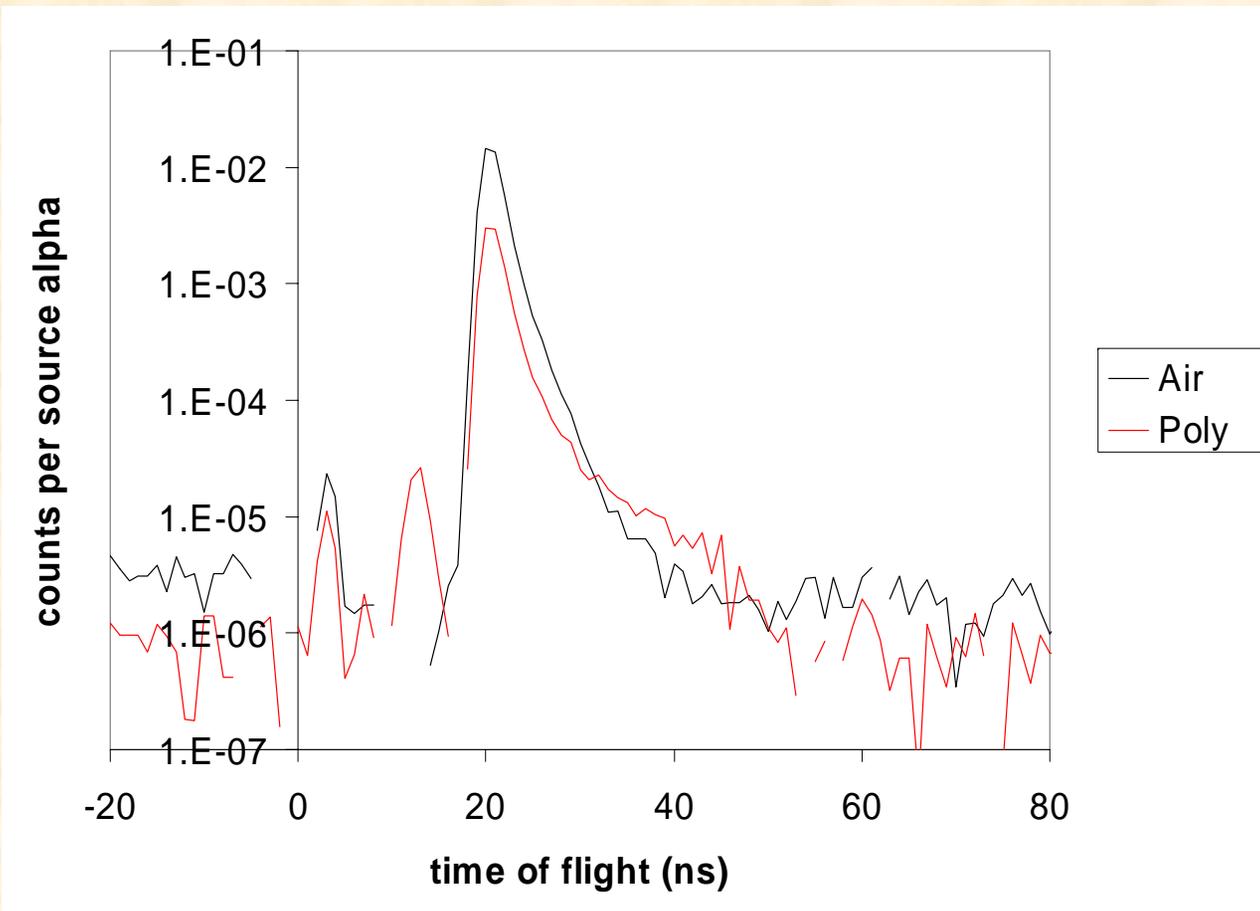
Photograph of DT Generator with Alpha Detector

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**Photograph of Source-Sample-Detector Configuration
for the DT Generator Measurements with an Al Cylinder.**



Comparison of Time-of-Flight Transmission Data with the DT Generator

Conclusions

- **Time of Flight Transmission Measurements with a DT Generator Using Directional Time-tagging of the Associated Alpha That Defines a Cone of Neutrons Aimed at the Target is not Affected by Floor Reflection.**
- **Neutrons Scattered From the Floor are Randomly Distributed in time Since They are Not Time-tagged by the Alpha Detector and Can Easily be Subtracted.**
- **Thus, the Alpha-tagged DT Generator is More Useful Than a Time-tagged Cf Source Since There will be No Mixing of Fission Response With Floor Reflection.**
- **In Addition There are Many Other Advantages That have Previously been Reported.**