FNAL Source Test

- Proof of technique for 2% absolute calibration of HCAL
- Timescale: August 2001 when the first QIE arrive
- Eventually to be performed on the assembled detector
- 2 mC Cesium or Strontium source (0.6 or 1.2 MeV electrons) scanned across each tile at 10 cm/s giving a data point every 2 mm

\[
\frac{2 \times 10^{-3} \text{ m}}{0.1 \text{ m/s}} = 0.01 \text{ s}
\]
Source Test

2% calibration

⇒ approximately $10^5 - 10^6$ events

Scanning speed (and electronics drift)

⇒ data collection in about 10 ms

The fastest mode to get data from the QIE to the DCC is to run the HTR in a data-streaming mode

$$40 \text{MHz} \times 2 \ \text{Bytes} \times 10^{-2} \text{s} = 800 \ \text{KBytes}$$

(400K events)

We plan to collect a 5 second data stream,

⇒ 400 MBytes (768MByte CPU memory)

(2M events)
FNAL Source Test

**Hardware needed:**

Megatile, fibers, source scan mechanics? (FNAL)
HPD (2 ch.) (UM)
QIE (2 ch.)+ readout card with commercial G-Link trans. (FNAL)
VME 6U/9U crate (FNAL?)
P3 CPU with 768M memory, ethernet+S-Link rec. (UIC?)
TTC system (FNAL?)
DCC with LVDS rec. and S-Link trans. (BU)
HTR (1 card, 2 ch.) with G-link rec. and LVDS trans. (UMd)
PC with ethernet, 20 GByte disk storage, CD write, tape write? (FNAL?)
Software

- HTR code to start and stop data stream with simple error checking, and PH averages
- Code to write to disk over ethernet (file management)
- Off line analysis
Cost Estimate

VME crate  7.5k
CPU       5.0k
PC        2.5k
Misc.     5.0k

20k (total)

(assuming existing HPD, QIE, HTR, TTC, DCC)
Logistics

Move demonstrator from UMd?
Set up new crate at BU and move to FNAL?
Set up new crate at FNAL?
Move crate from UIC?