

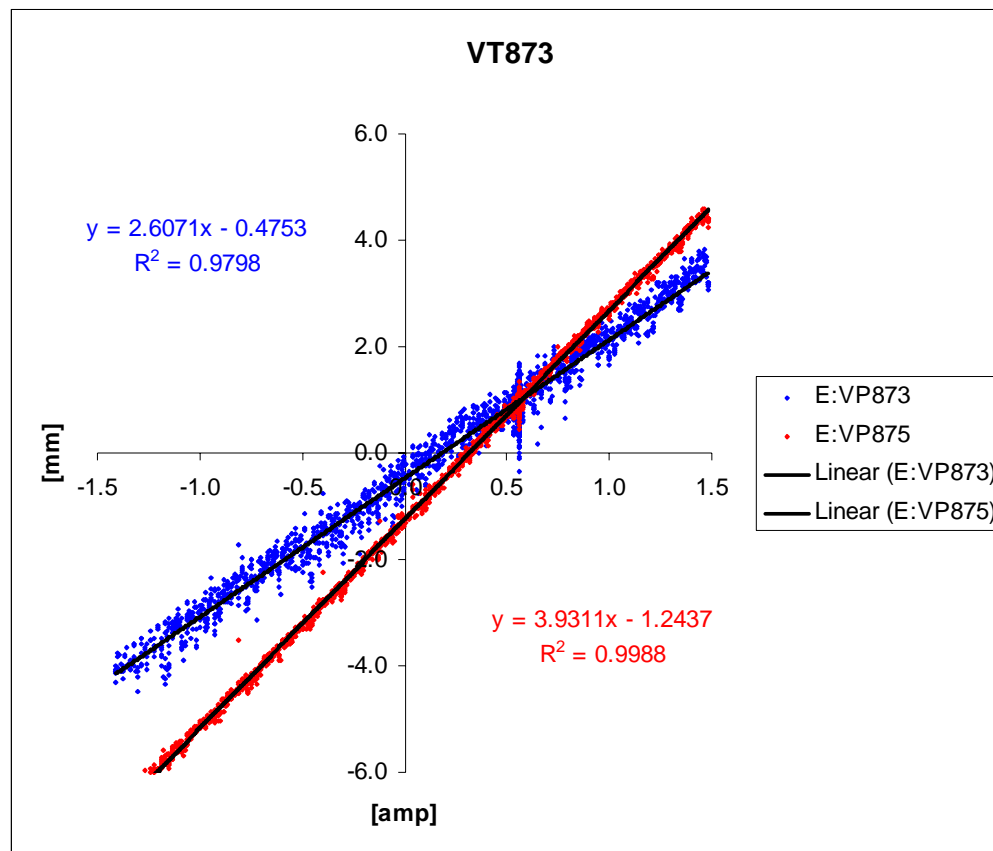
# The MiniBooNE Primary Beamline

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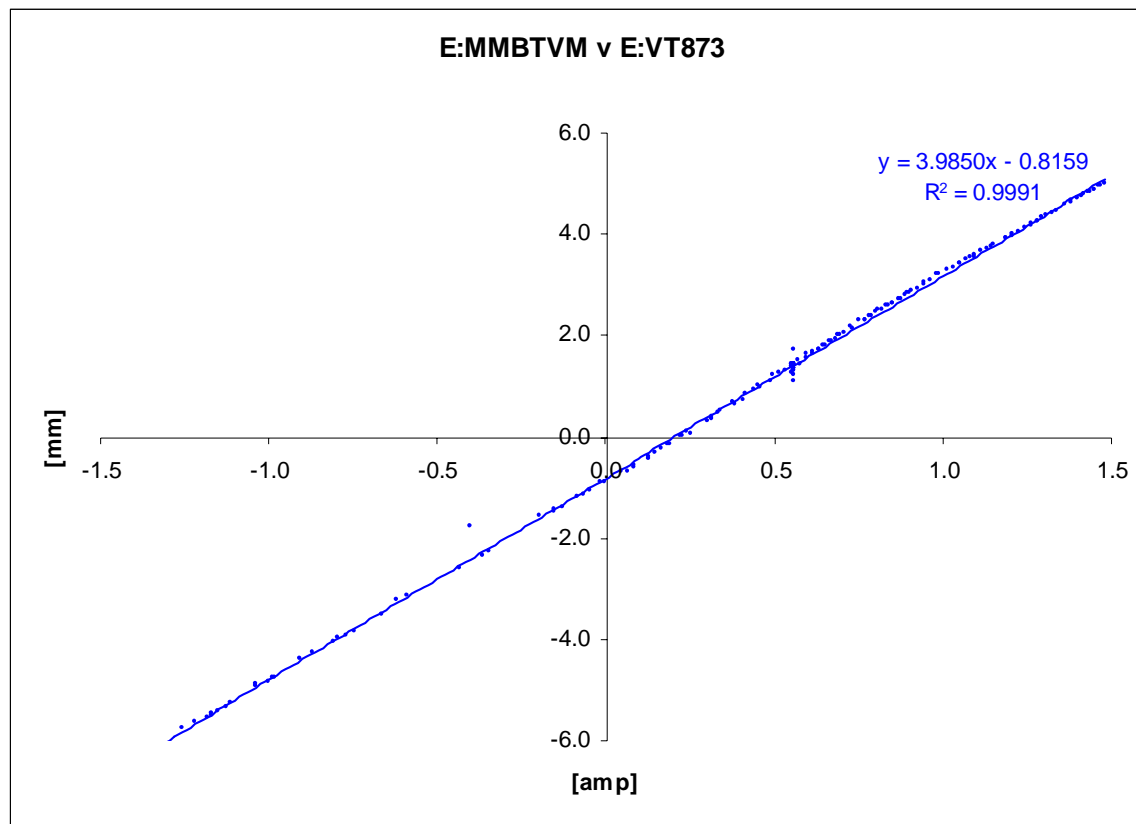
# Lattice Measurement

- Vary trim magnets, one at a time.
- Measure the response at each beam position monitor (BPM) and multewire MW).
- Compare the measured and predicted response functions.
- Adjust quadrupole constants as needed.

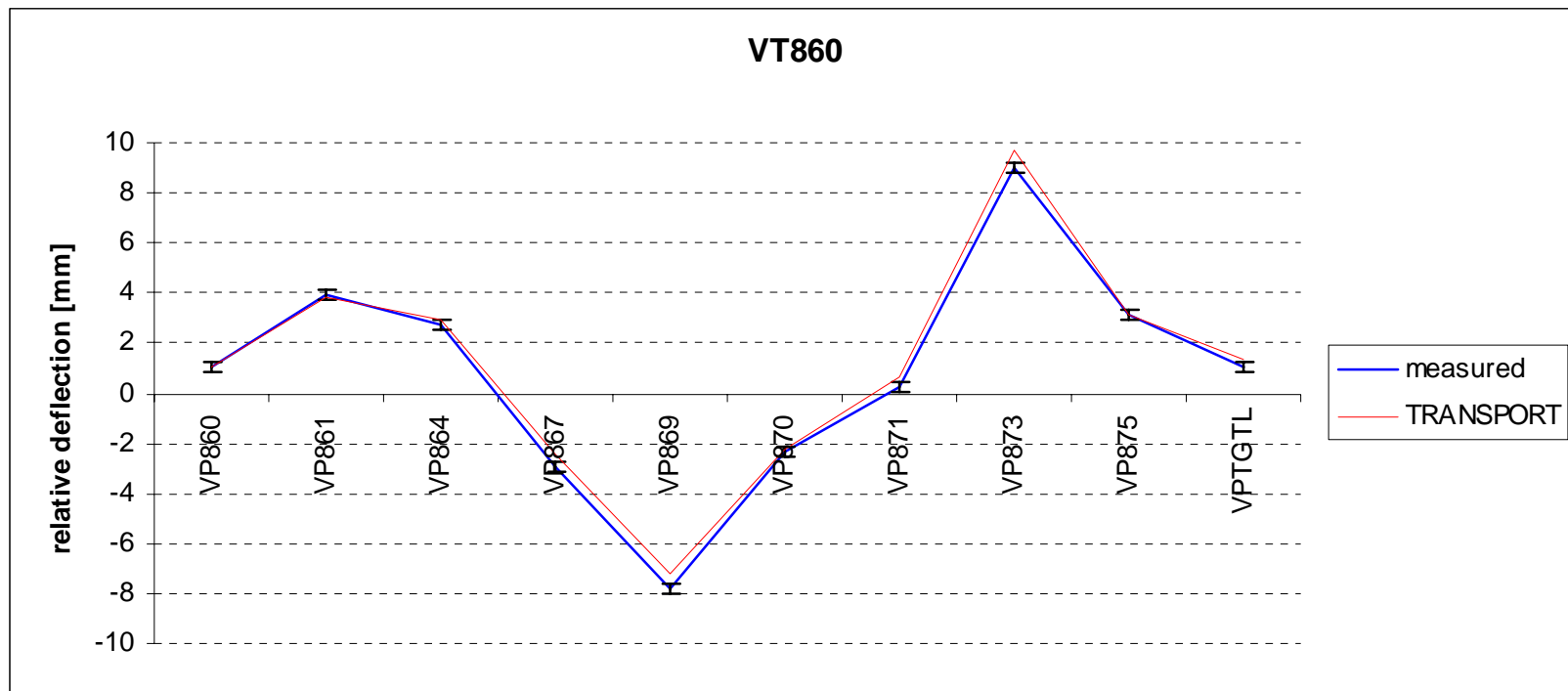
# Linearity of Kick at Beam Position Monitors



# Linearity of Kick at Multiwire



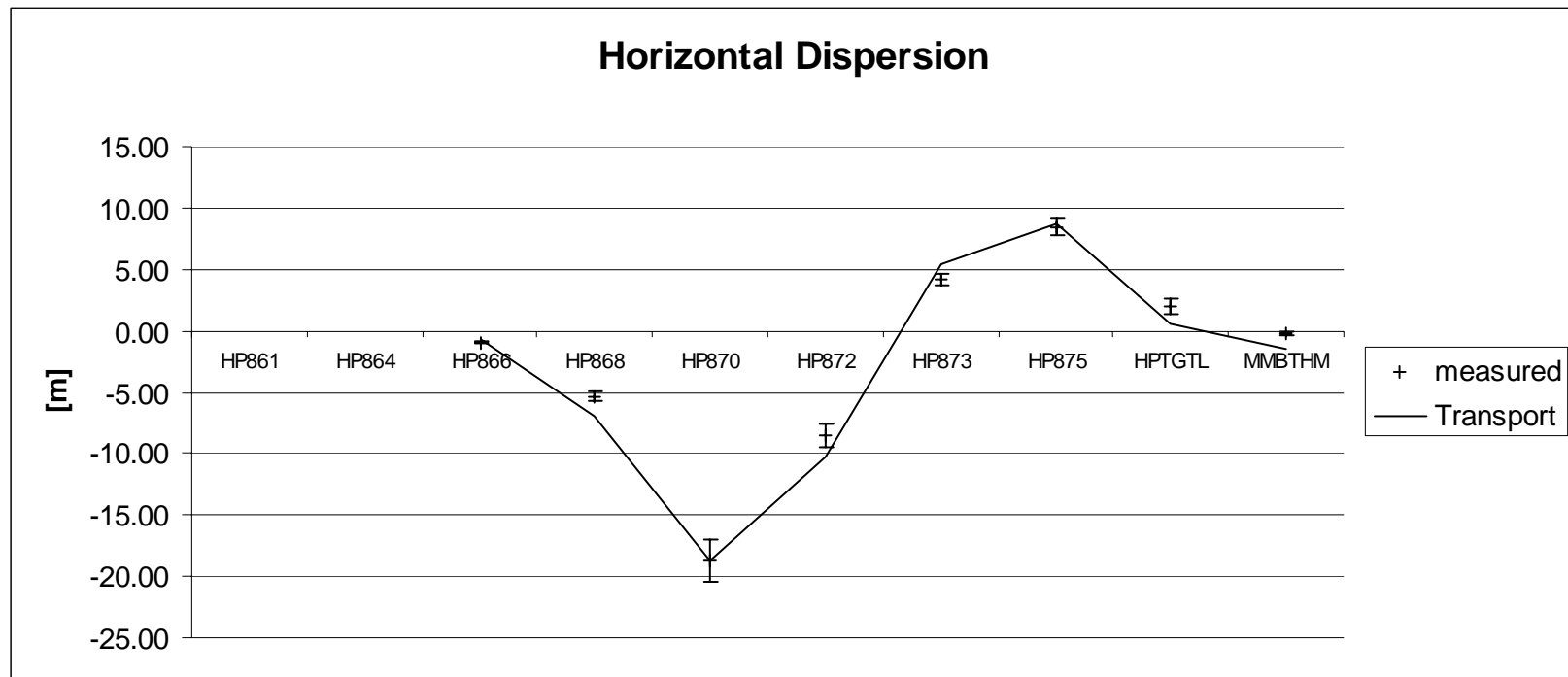
# Example Measurement of Response Function



# Independent Measurement of Dispersion

- Insert a thin foil of known thickness into beamline.
- This changes the beam momentum by a known amount.
- Downstream beam position changes due to momentum mismatch.
- Measurements are compared with predictions.

# Measured Dispersion



# Phase Space Measurement

- Once the lattice is understood, use measurements of beam width of deduce initial phase space of beam.
- Measure beam profile at multiple locations.
- Vary initial phase ellipse to fit data.



# Fit to Beam Width

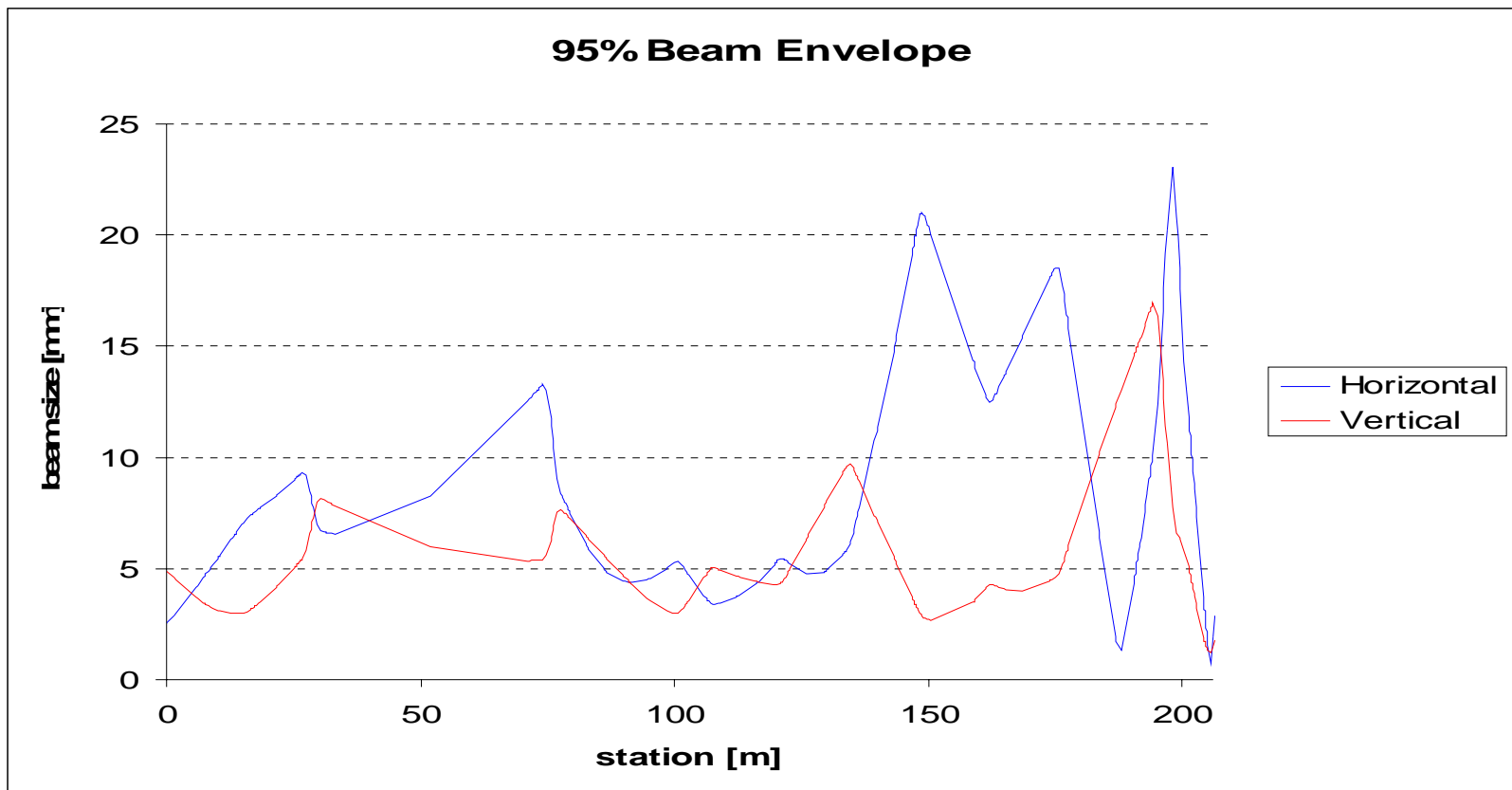


# Final Model

- Once the lattice and initial phase ellipse are known, the beam may be propagated to any location along the beamline.
- The “Aperture Figure of Merit” used in EBD is:

$$\text{FOM} = [\text{aperture} - \text{width}(95\%)]/[2*\text{width}(1\sigma)]$$

# Beam Envelope



# Aperture FOM

