Update on Vibration Measurements at CERN

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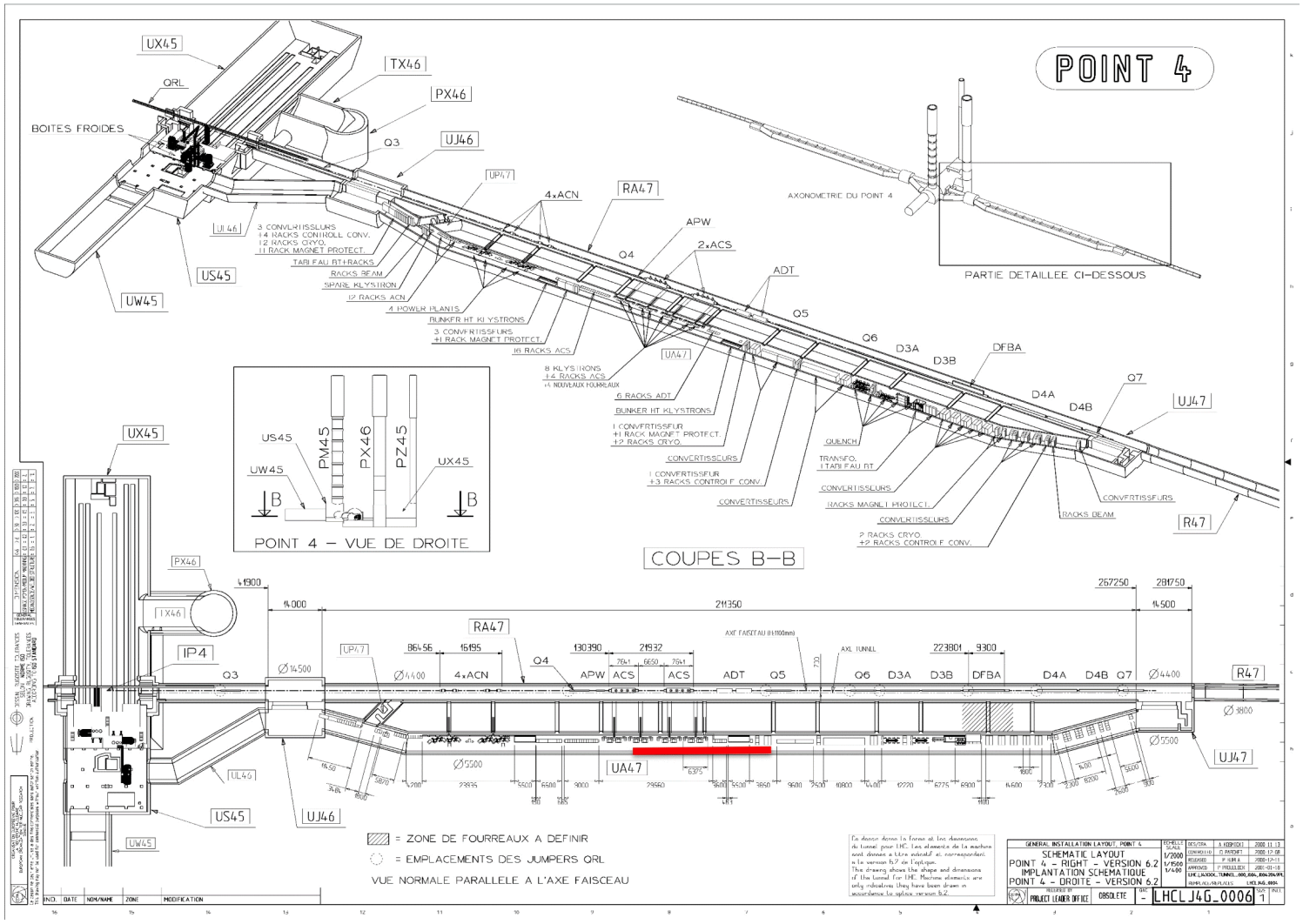
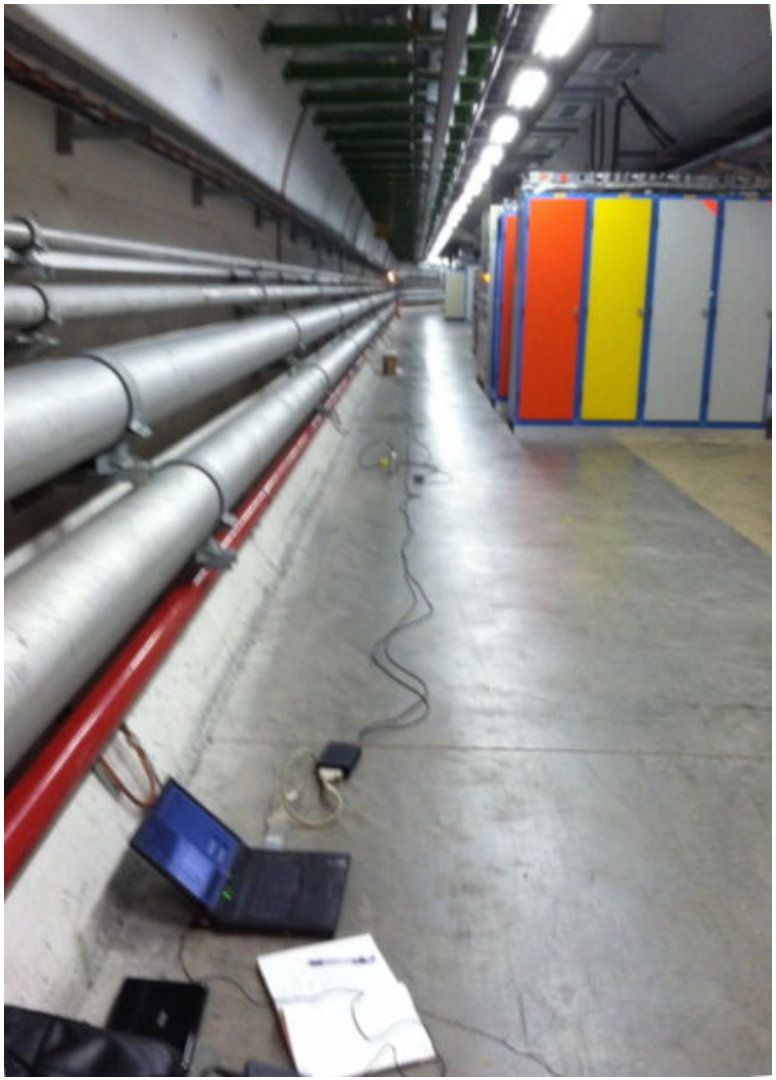
Measurements

- Plan
  - Measure vibration correlations across “Point 4” hall, as model of future linear collider interaction region
- Actual
  - Unable to access hall itself
  - Measured vibration correlation vs distance in eqpt tunnel

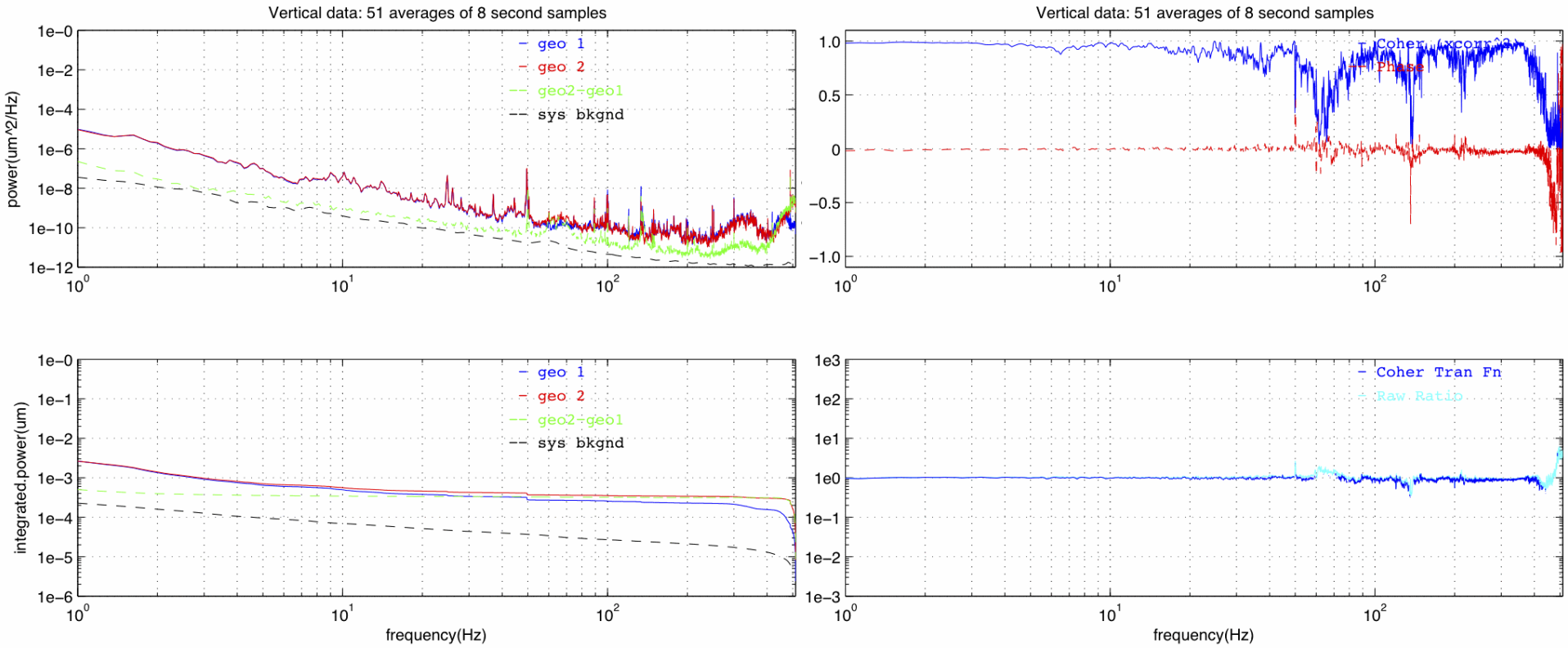
Point 4


POINT 4
UX45
ORL
TX46
PX46
BOITES FROIDES
Q3
UJ46
UP47
4xACN
RA47
APW
2xACS
Q4
ADT
Q5
Q6
D3A
D3B
DFBA
D4A
D4B
Q7
UJ47
R47
US45
UW45
UL46
UA47
IP4
AXONOMETRIC DU POINT 4
PARTIE DETAILLEE CI-DESSOUS
3 CONVERTISSEURS
+4 RACKS CONTROLL CONV.
+2 RACKS CRYO.
+1 RACK MAGNET PROTECT.
TABLEAU BT+RACKS
RACKS BEAM
SPARE KLYSTRON
12 RACKS ACN
4 POWER PLANTS
BUNKER HT KLYSTRONS
3 CONVERTISSEURS
+1 RACK MAGNET PROTECT.
16 RACKS ACS
8 KLYSTRONS
+4 RACKS ACS
+4 NOUVEAUX FOURREAUX
6 RACKS ADT
BUNKER HT KLYSTRONS
1 CONVERTISSEUR
+1 RACK MAGNET PROTECT.
+2 RACKS CRYO.
CONVERTISSEURS
1 CONVERTISSEUR
+3 RACKS CONTROLE CONV.
CONVERTISSEURS
QUENCH
TRANSFO.
1 TABLEAU BT
CONVERTISSEURS
RACKS MAGNE. PROTECT.
CONVERTISSEURS
2 RACKS CRYO.
+2 RACKS CONTROLE CONV.
CONVERTISSEURS
RACKS BEAM
CONVERTISSEURS
PM45
PX46
PZ45
POINT 4 – VUE DE DROITE
COUPES B–B
= ZONE DE FOURREAUX A DEFINIR
= EMPLACEMENTS DES JUMPERS QRL
VUE NORMALE PARALLELE A L'AXE FAISCEAU
GENERAL INSTALLATION LAYOUT, POINT 4
SCHEMATIC LAYOUT
POINT 4 – RIGHT – VERSION 6.2
IMPLANTATION SCHEMATIQUE
POINT 4 – DROITE – VERSION 6.2
PROJECT LEADER OFFICE
OBSOLETE
LHCLJ4G_0006

Measurements

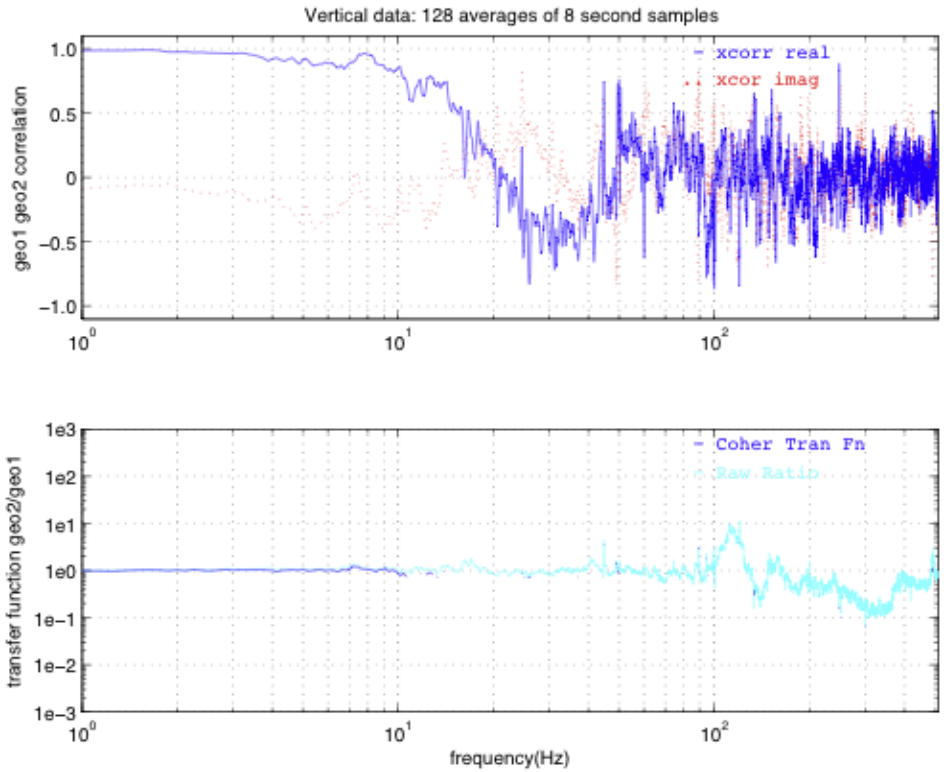


Sensors Together

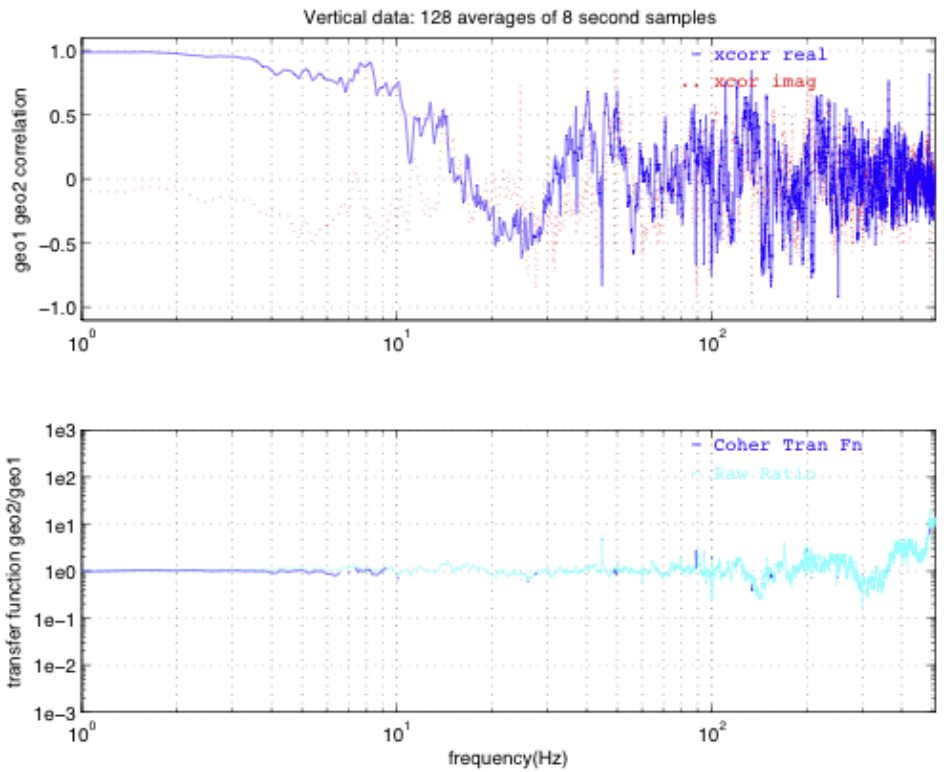


- Surprisingly low vibration levels (~10x below SLC)
- Good agreement between sensors
- Probably slight aliasing above 200 Hz

Sensors Separated: Unsmoothed

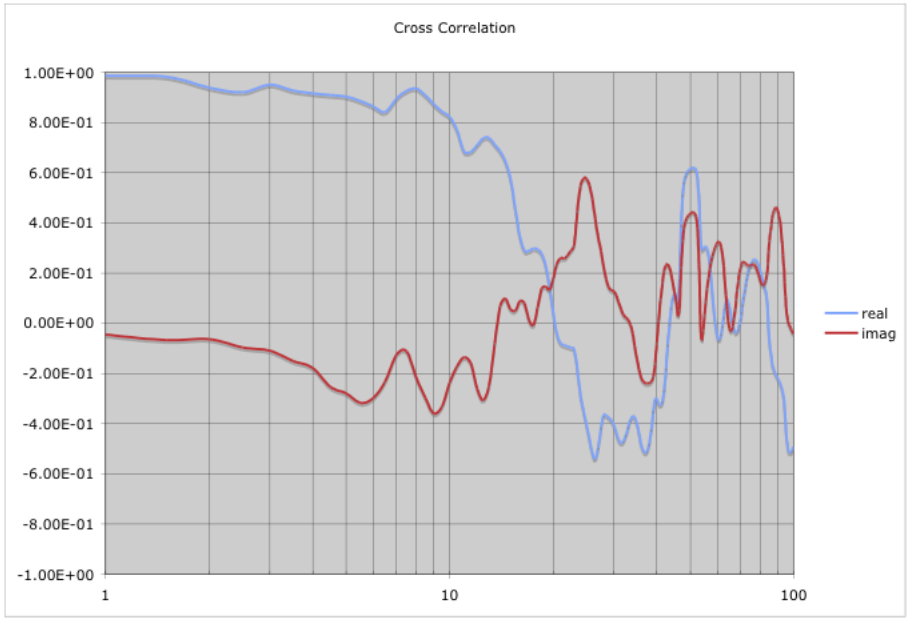


20 m

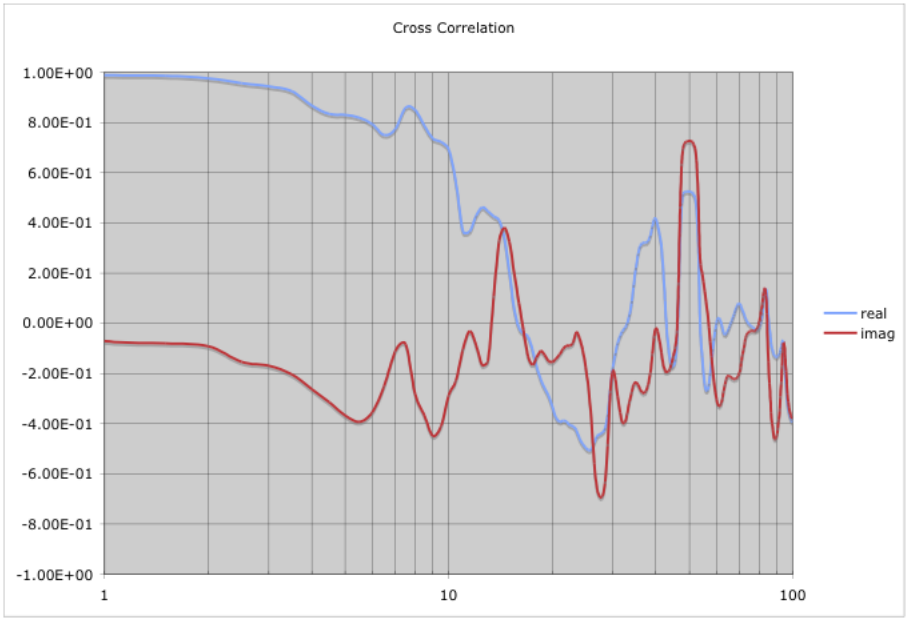


30 m

Sensors Separated: Smoothed



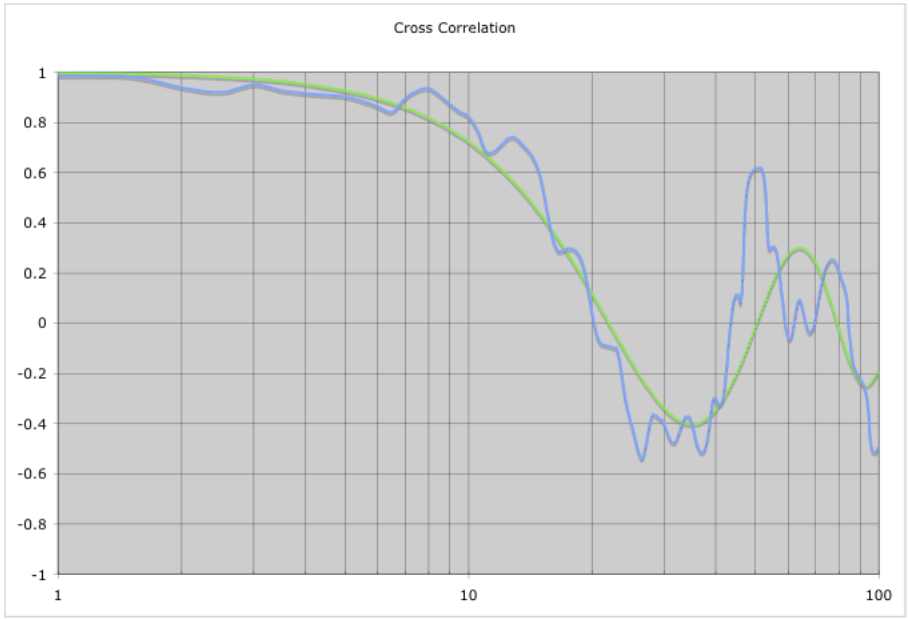
20 m

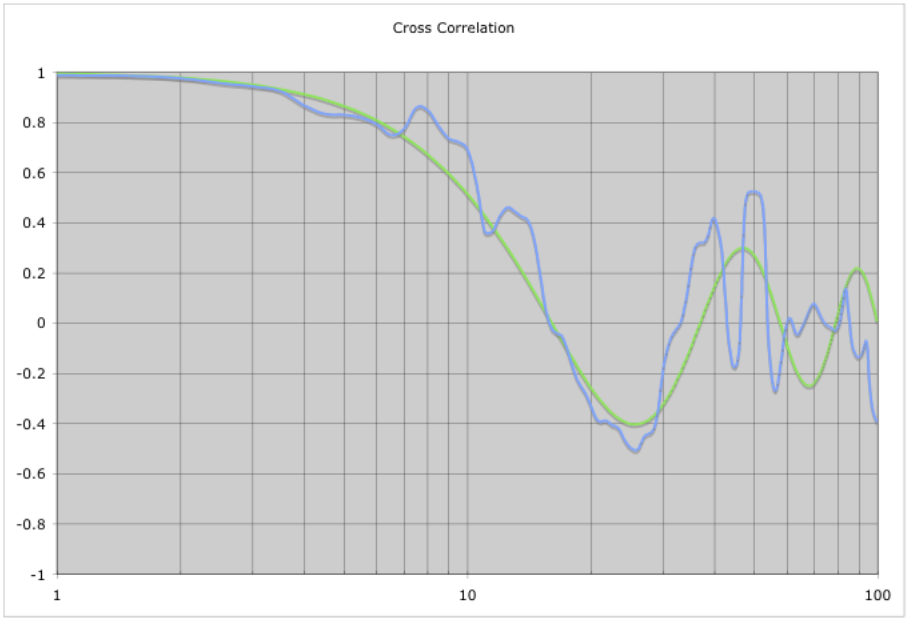


30 m

Smoothing: logarithmic smoothing in frequency-space with Hann window, 1/10 octave FWHM

Simple Fit: Isotopic Source Distn



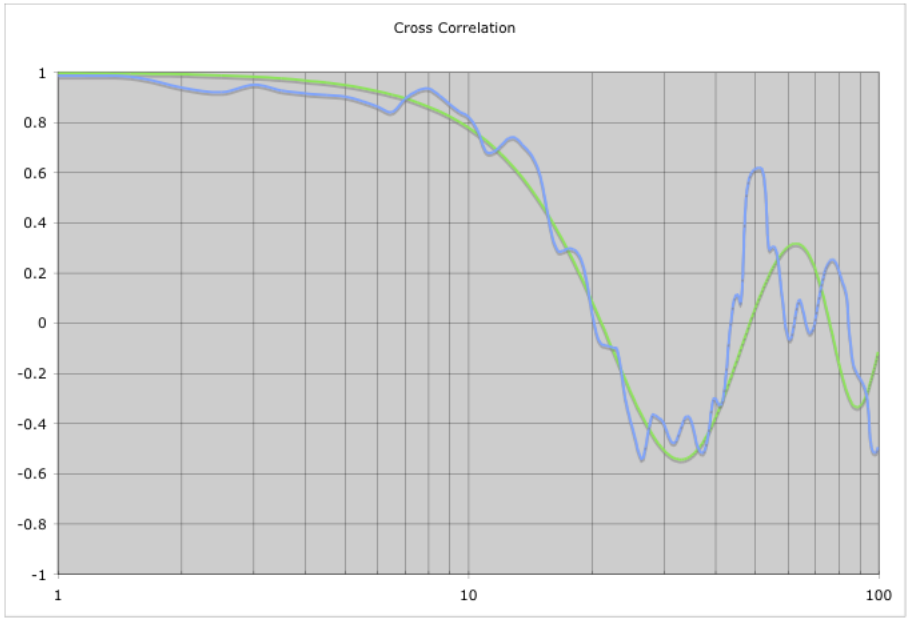


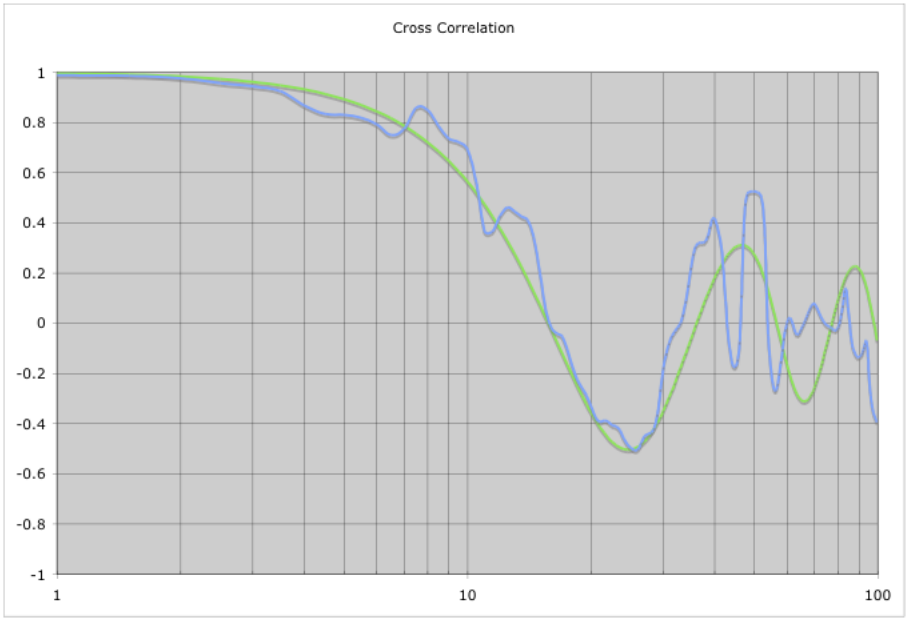
20 m separation
Fit ~1150 m/s

30 m separation
Fit ~1260 m/s

Model: $J_0\left(\frac{\omega L}{v}\right)$

Two-Parameter Fit: Directional





20 m separation
Fit ~1100 m/s,
19% directional

30 m separation
Fit ~1230 m/s,
15% directional

Model adds directional term: $\cos\left(\frac{\omega L}{v}\right)$