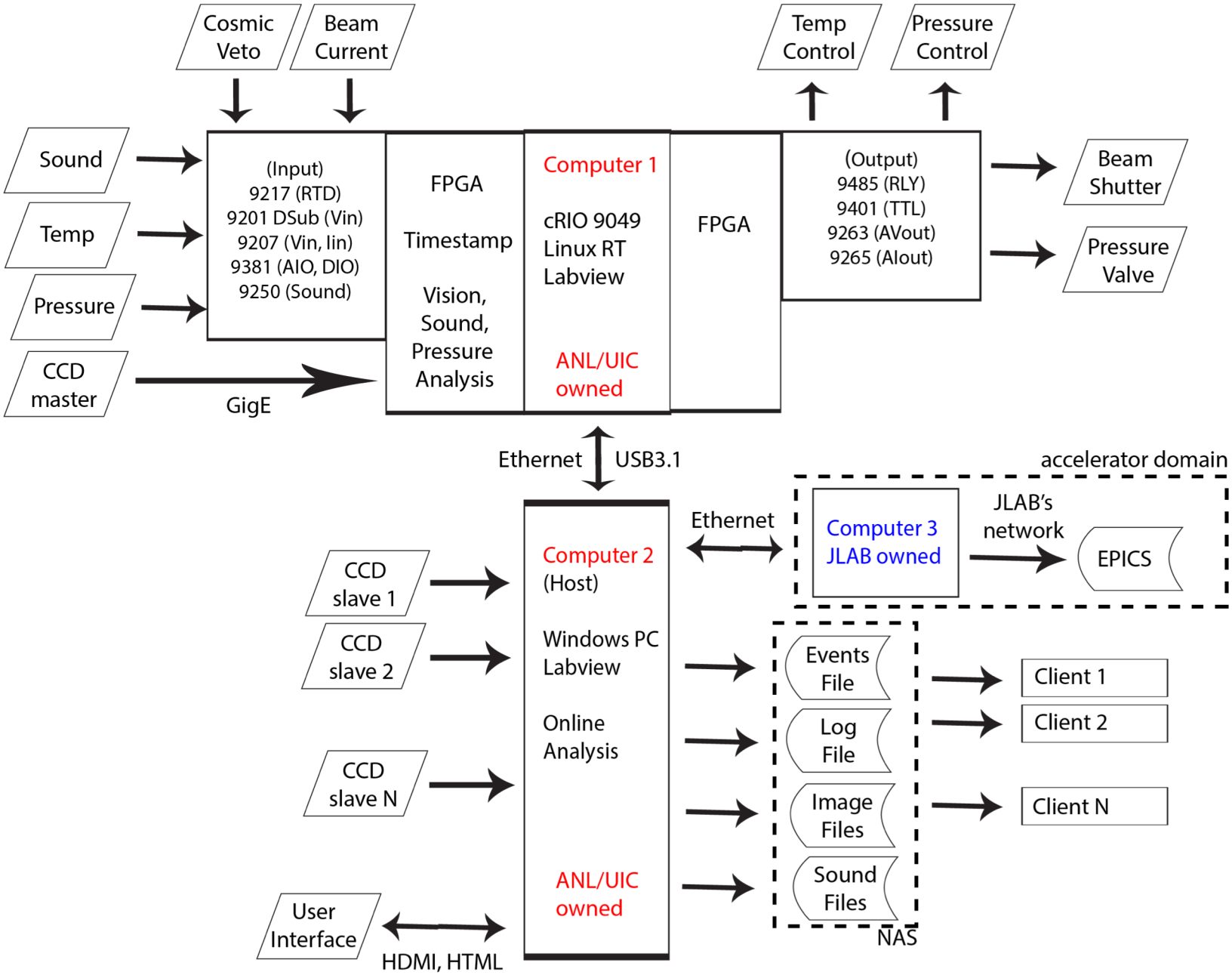
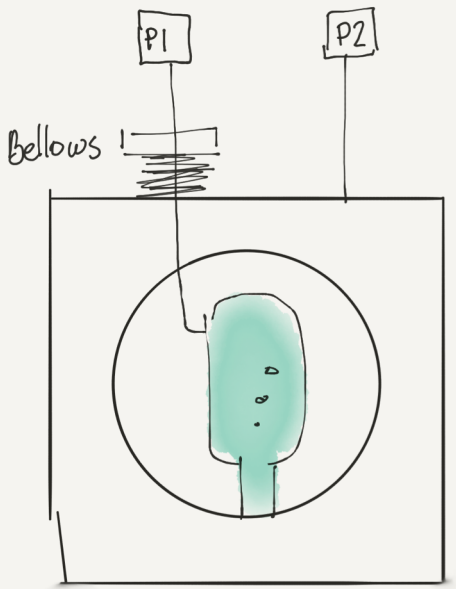

Cosmic Veto
Beam Current
Temp Control
Pressure Control
Sound
Temp
Pressure
CCD master
GigE
(Input)
9217 (RTD)
9201 DSub (Vin)
9207 (Vin, Iin)
9381 (AIO, DIO)
9250 (Sound)
FPGA
Timestamp
Vision, Sound, Pressure Analysis
Computer 1
cRIO 9049
Linux RT
Labview
ANL/UIC owned
FPGA
(Output)
9485 (RLY)
9401 (TTL)
9263 (AVout)
9265 (AIout)
Beam Shutter
Pressure Valve
Ethernet
USB3.1
accelerator domain
Ethernet
Computer 3
JLAB owned
JLAB's network
EPICS
CCD slave 1
CCD slave 2
CCD slave N
Computer 2
(Host)
Windows PC
Labview
Online Analysis
ANL/UIC owned
Events File
Log File
Image Files
Sound Files
NAS
Client 1
Client 2
Client N
User Interface
HDMI, HTML

Acoustic discrimination with active noise cancellation



Signal = P1 − P2

Bellows:
NEC VI-2. Pneumatic suspension.

NI 9250 with BNC

2 AI, ±5 V, 24 Bit, 102.4 kS/s/ch Simultaneous

- BNC connectivity
- 114 dB dynamic range at 51.2 kS/s
- <10 µVrms noise
- Smart TEDS sensor compatibility
- Software-selectable IEPE signal conditioning
- Software-selectable AC/DC coupling

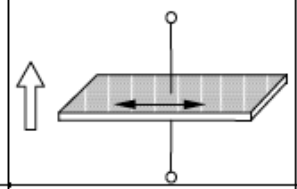
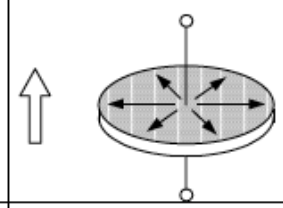
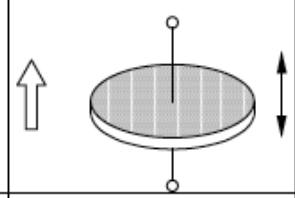
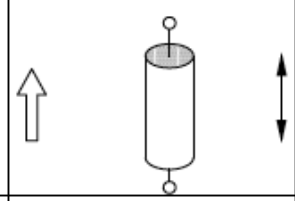
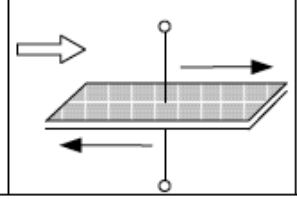
Piezoceramics
FERROPERM

Look at 3-25 kHz band

Szydagis et al. 2011
FFT -> Amplitude +
Frequency content

Definitions and Terminology

Piezoelectric Modes Of Vibration

Vibration Mode	Dimensions (L - Length, W - Width, T - Thickness, D - Diameter)		Constants To Be Calculated: Piezoelectric	Constants To Be Calculated: Mechanical
Transverse Length Mode		$Th, W < L/5$	$k_{31}, d_{31}, g_{31}, \varepsilon_{33}^{T}$	$s_{11}^{D}, s_{11}^{E}, Q_{31}$
Radial Mode		$D > 10Th$	$k_p, \varepsilon_{33}^{S}, \varepsilon_{33}^{T}$	$\sigma^{E}, s_{12}^{E}, Q_p$
Thickness Extension Mode		$D > 10Th$	$k_t, \varepsilon_{33}^{S}$	$c_{33}^{D}, c_{33}^{E}, s_{13}^{E}, Q_t$
Longitudinal Length Mode		$D < L/2.5$	$k_{33}, d_{33}, g_{33}, \varepsilon_{33}^{T}$	$s_{33}^{D}, s_{33}^{E}, Q_{33}$
Thickness Shear Mode		$L > 3.5(Th,W)$	$k_{15}, d_{15}, g_{15}, \varepsilon_{11}^{T}, \varepsilon_{11}^{S}$	$c_{55}^{D}, s_{55}^{D}, s_{55}^{E}, Q_{15}$

Polarisation direction ⇧ Direction of displacement, →