

Ultralyd billedannelse

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Probe

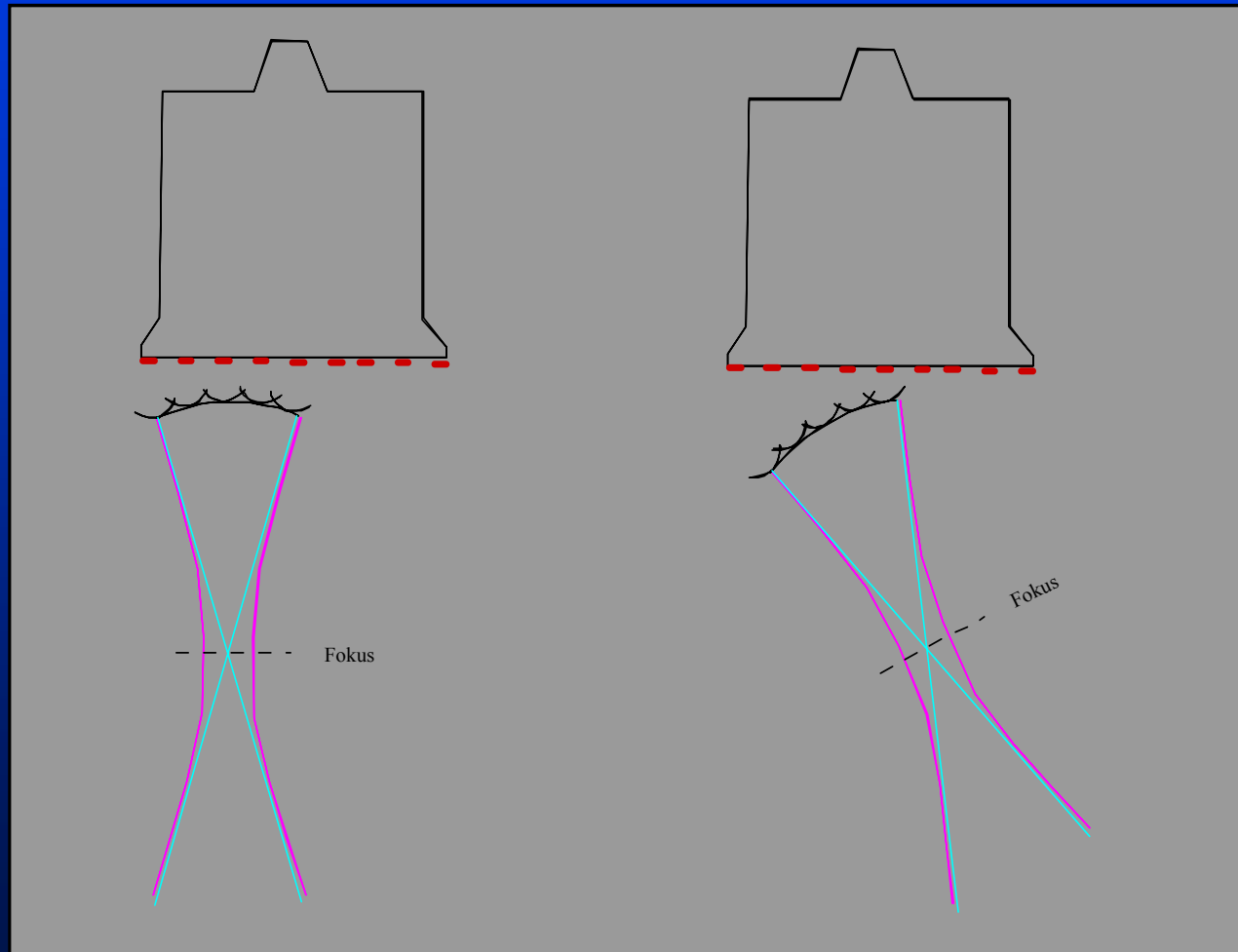
- 32-128 elementer
(bare noen få vist her)
- Stråleforming i
hovedplanet for styring
og fokusering av strålen
- Akustisk linse for
fokusering i den andre
dimensjonen



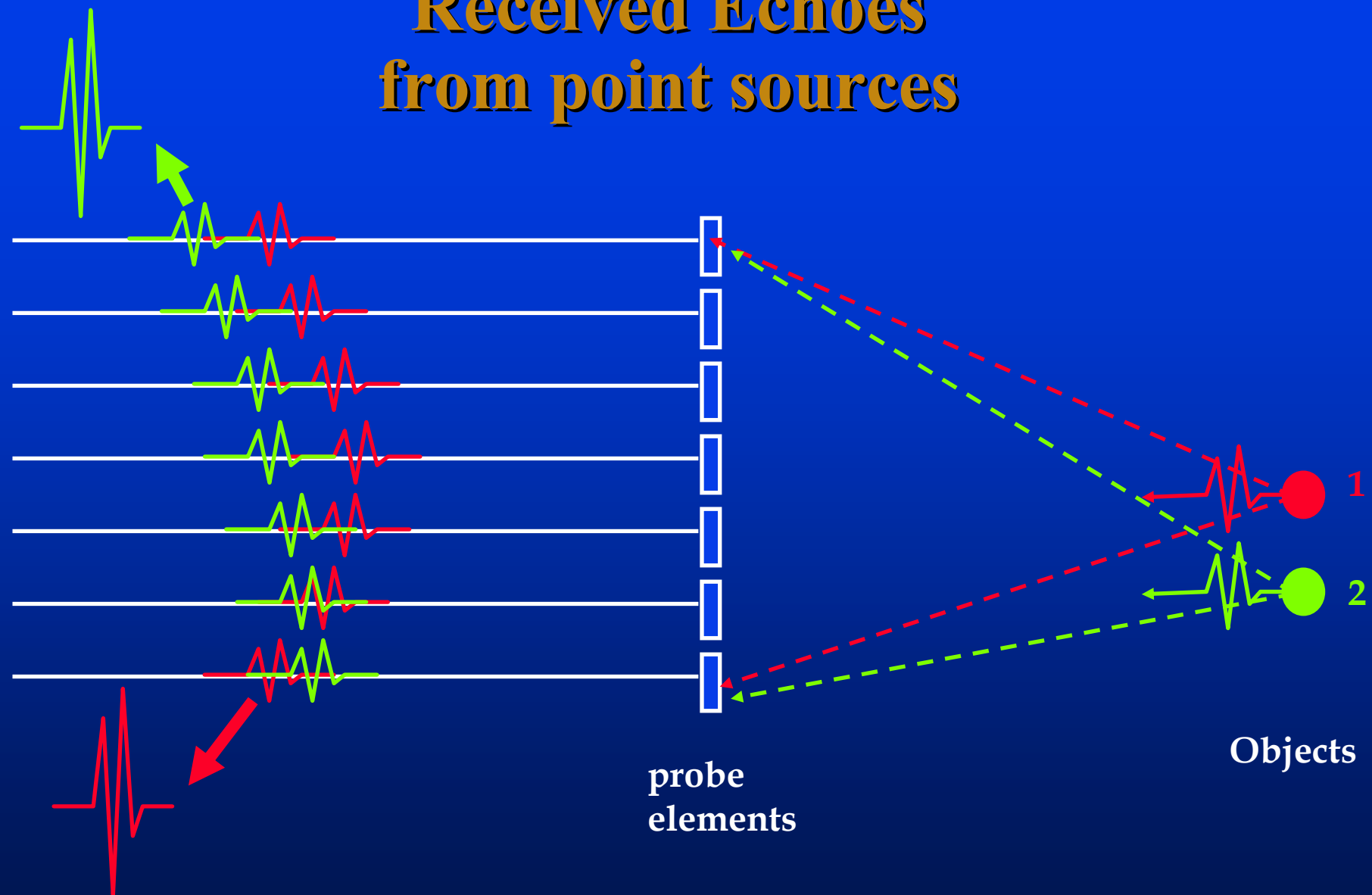
Elektronisk strålefokusering

Fokusering

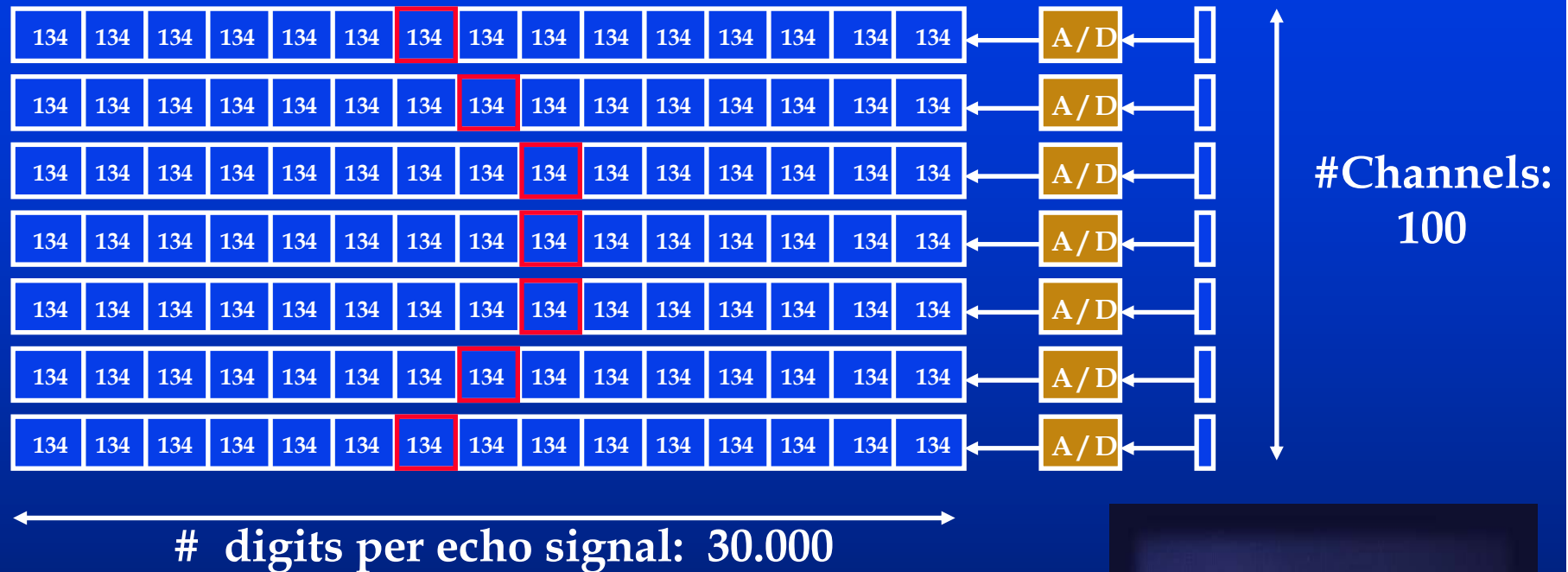
Styring og fokusering



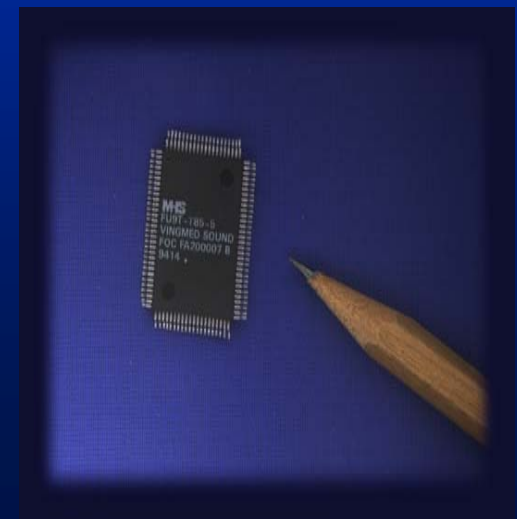
Received Echoes from point sources



Digital Beam Former



- Data per scanline: 3 M bytes
- Data per image: 150 M bytes
- Data per second: 1200 M bytes



Ultrasound Probes



Linear array
High resolution
Limited width

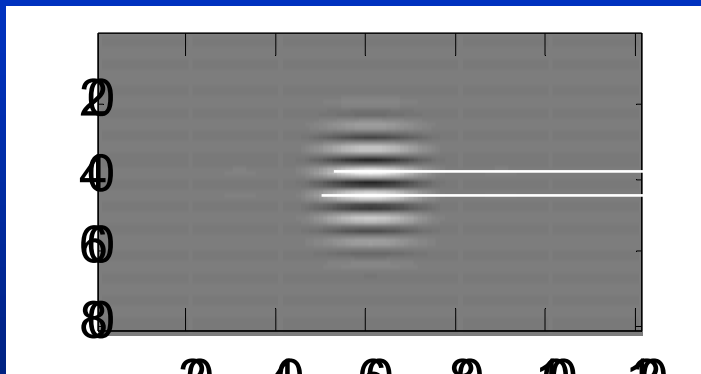


Curve-linear array
Large image width
Large near field



Phased array
Small footprint
90 deg. sector format

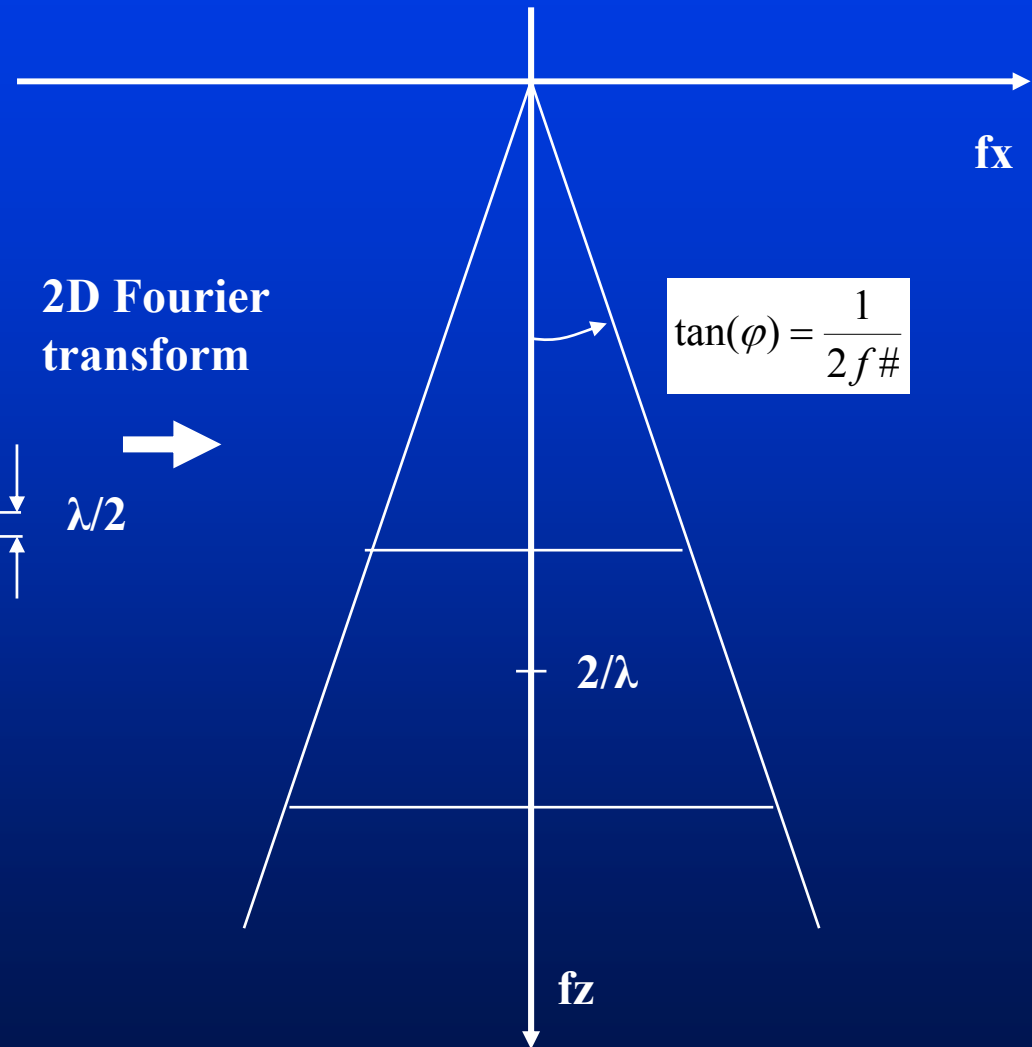
Point spread function in k-space

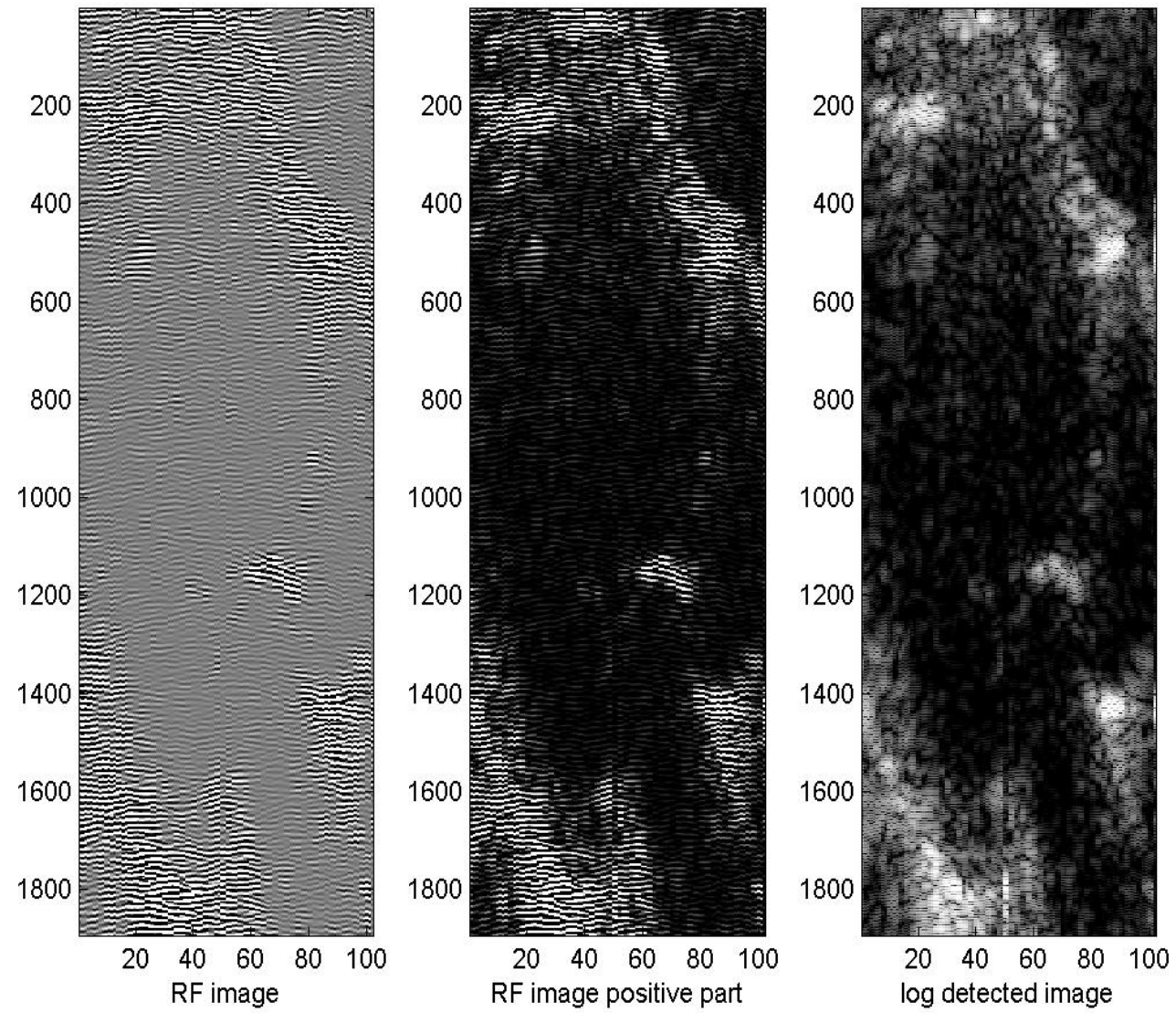


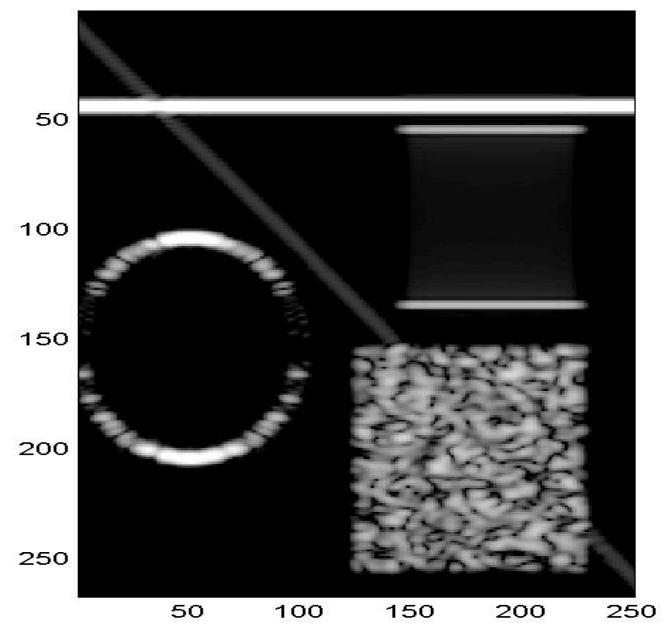
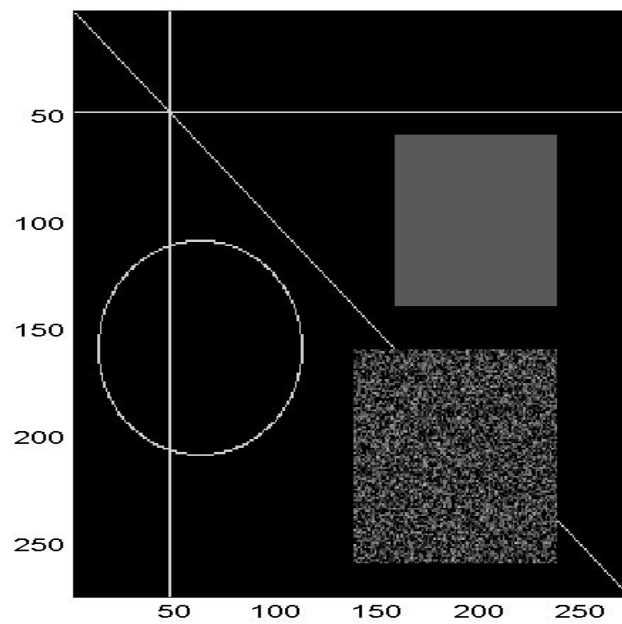
$$f\text{-number} : f\# = \frac{R}{a}$$

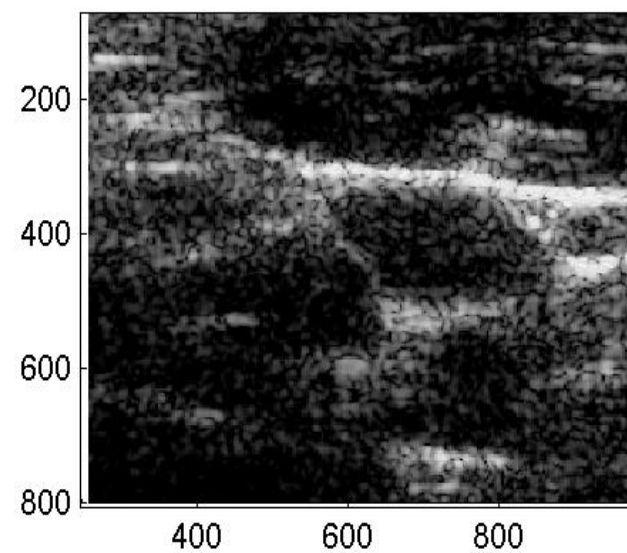
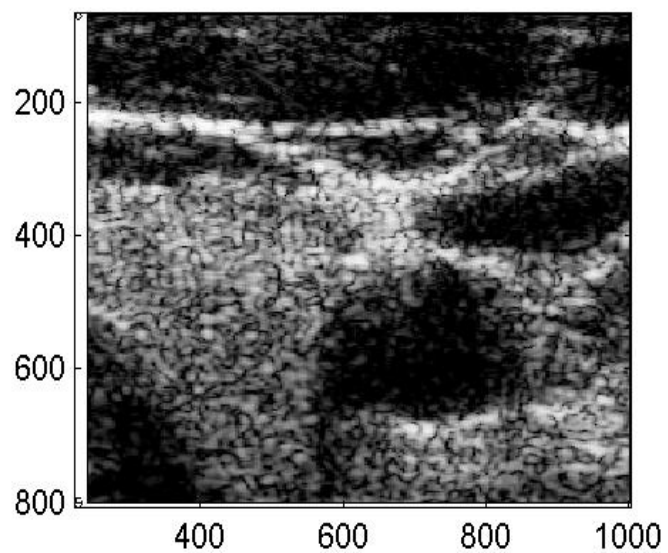
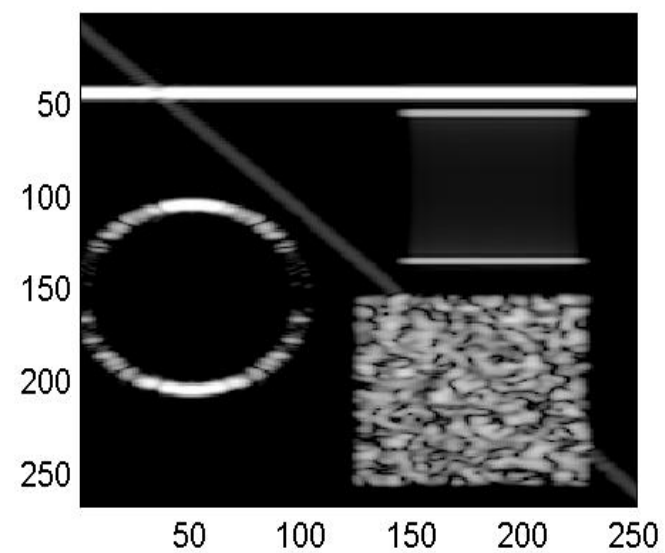
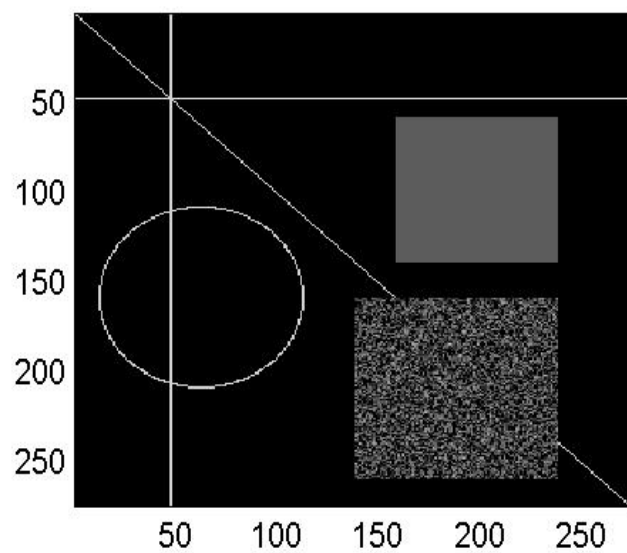
2D Fourier
transform

$$\lambda/2$$

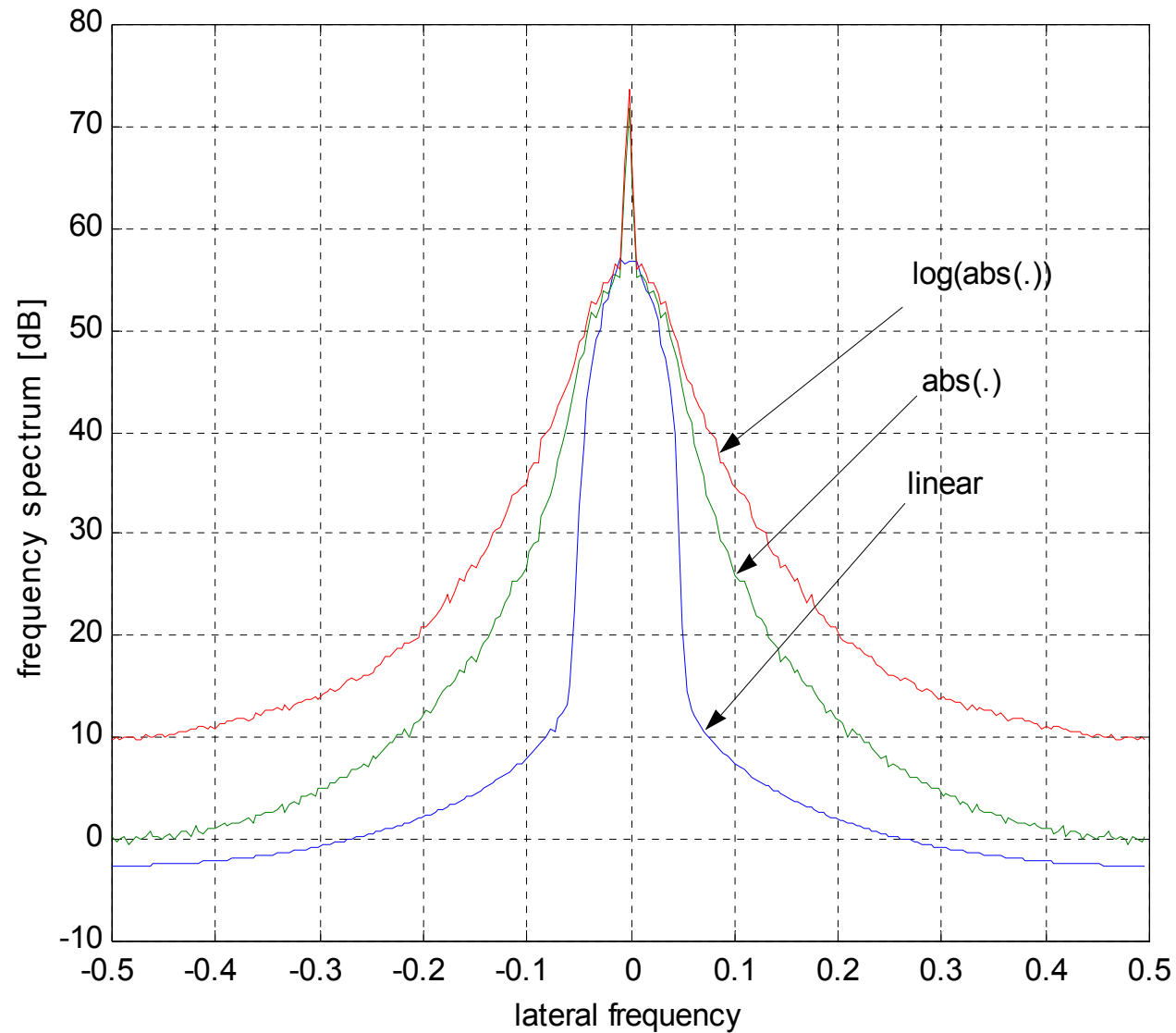




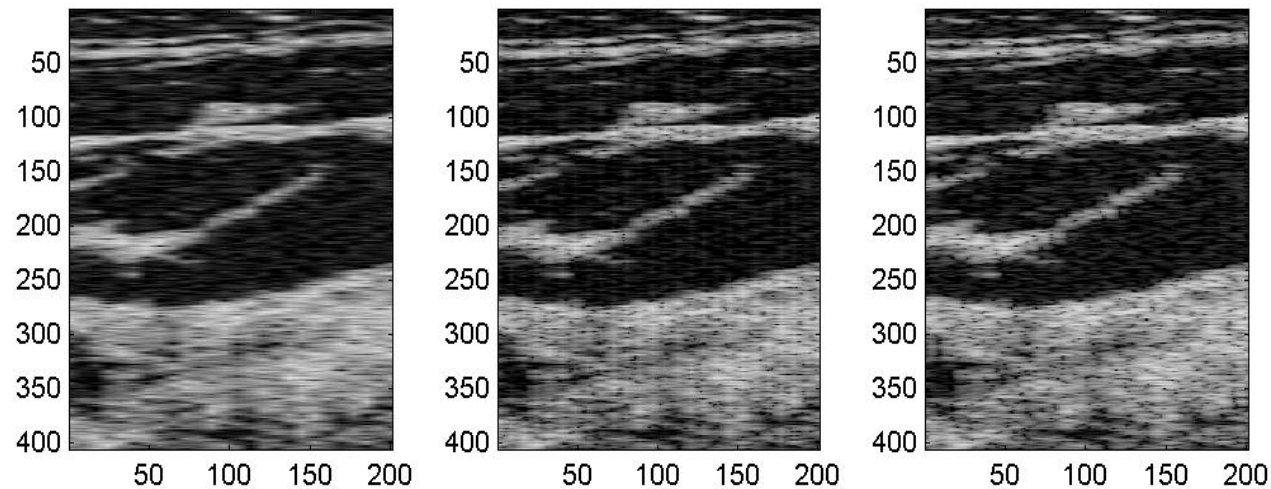
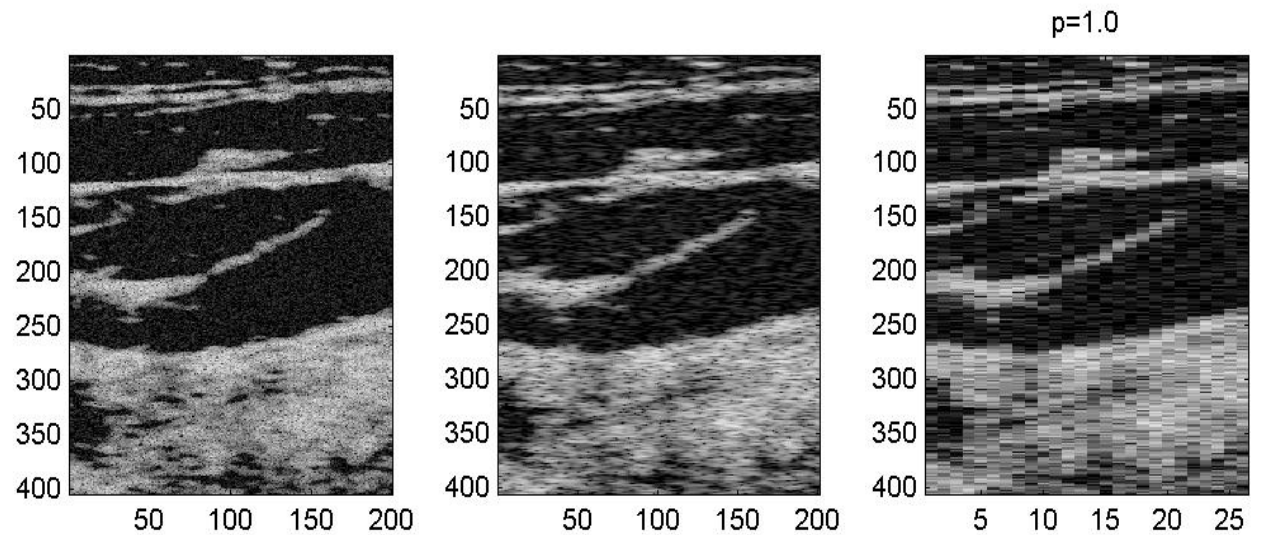




Lateral frequency spectrum Before and after detection



Lateral sampling and reconstruction

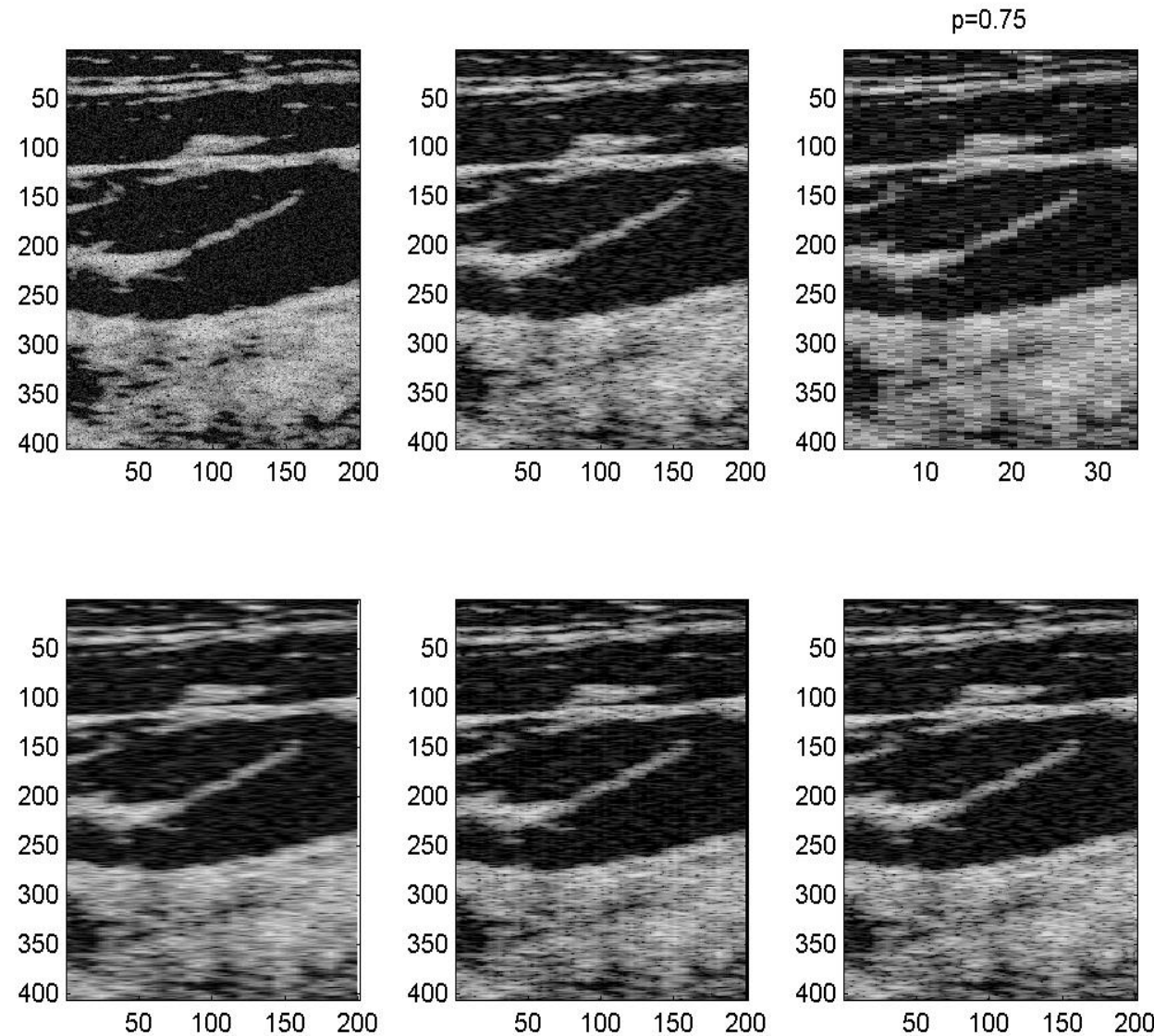


Lin.interp. after detection

Lin.interp. before detection

Spline interp. before

Lateral sampling and reconstruction



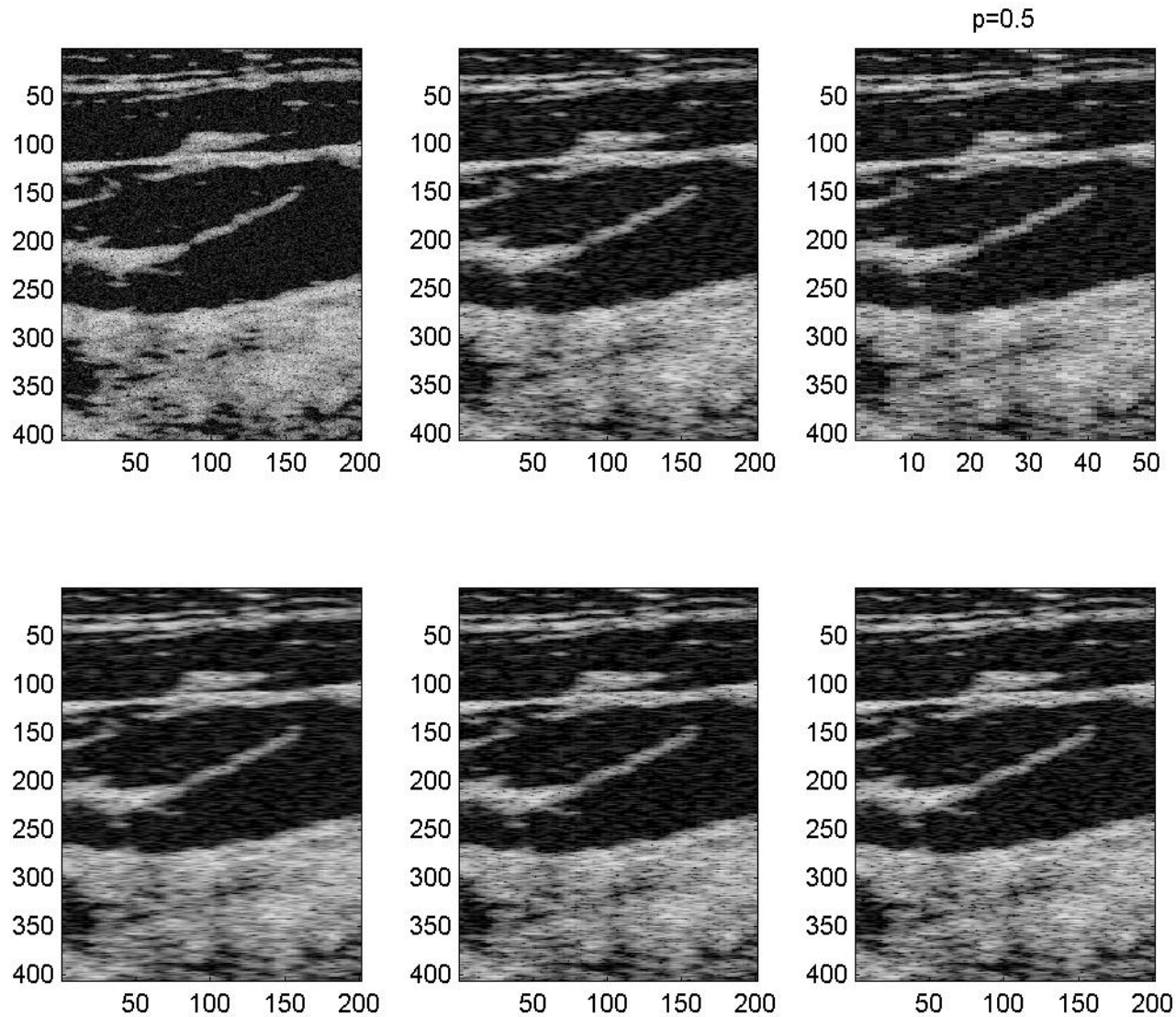
Lin.interp. after detection

Lin.interp. before detection

Spline interp. before

detection

Lateral sampling and reconstruction



Lin.interp. after detection

Lin.interp. before detection

Spline interp. before

detection

Multiple scan-line acquisition

- **Illuminate a larger part of the image view by transmitting a wide beam**
- **Receive and separate echoes from different directions inside the transmitted beam**

