Low Coherence Optical Reflectometer

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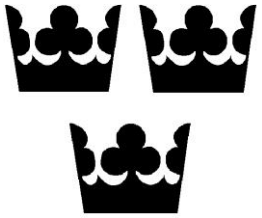

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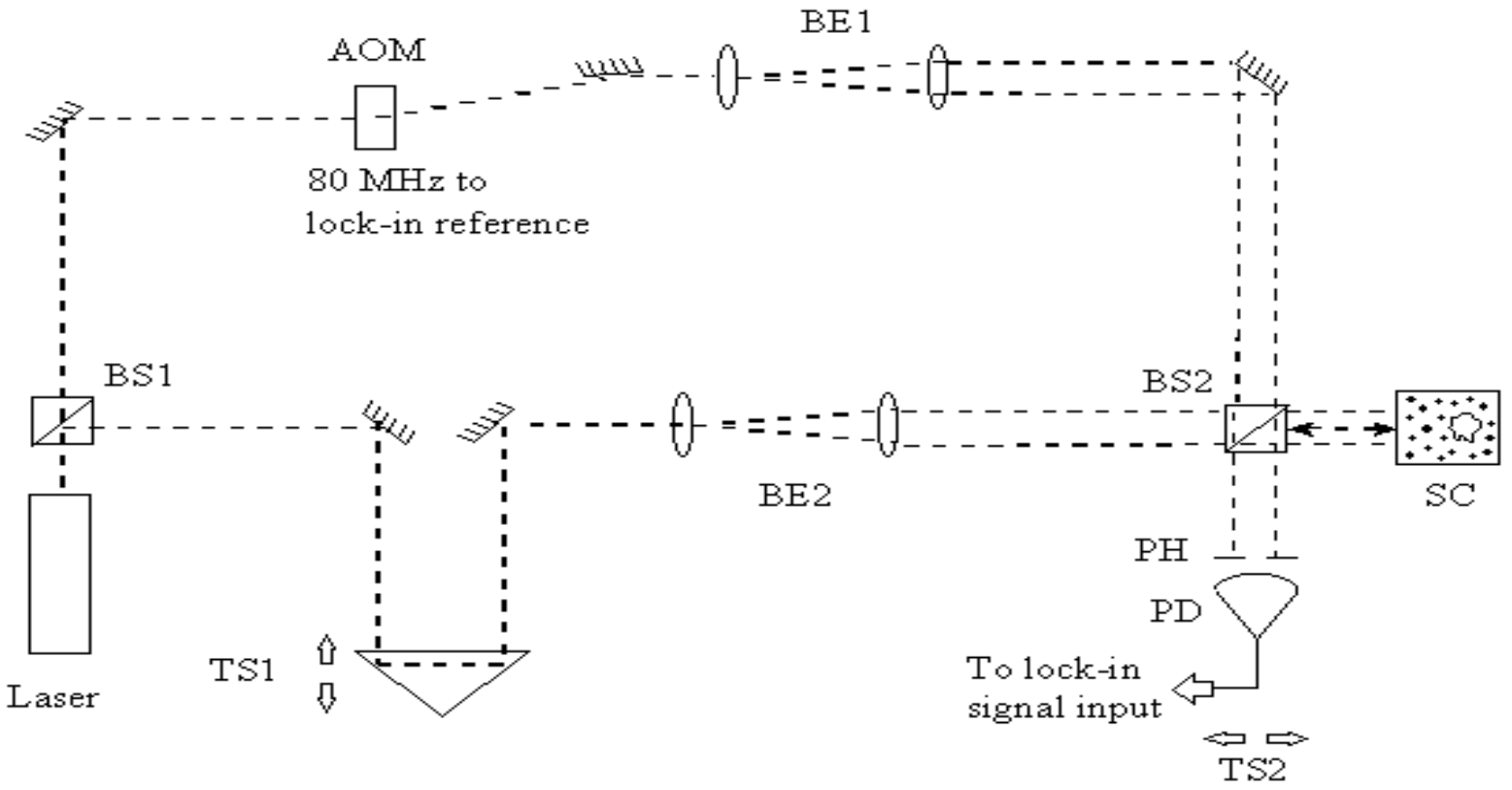
Objectives:

- Imaging by reflection in random media
- Characterization of image quality as a function of scatterer size and concentration
  - mean free path length
  - transfer mean free path length
- Characterization of image quality as a function of target reflectivity

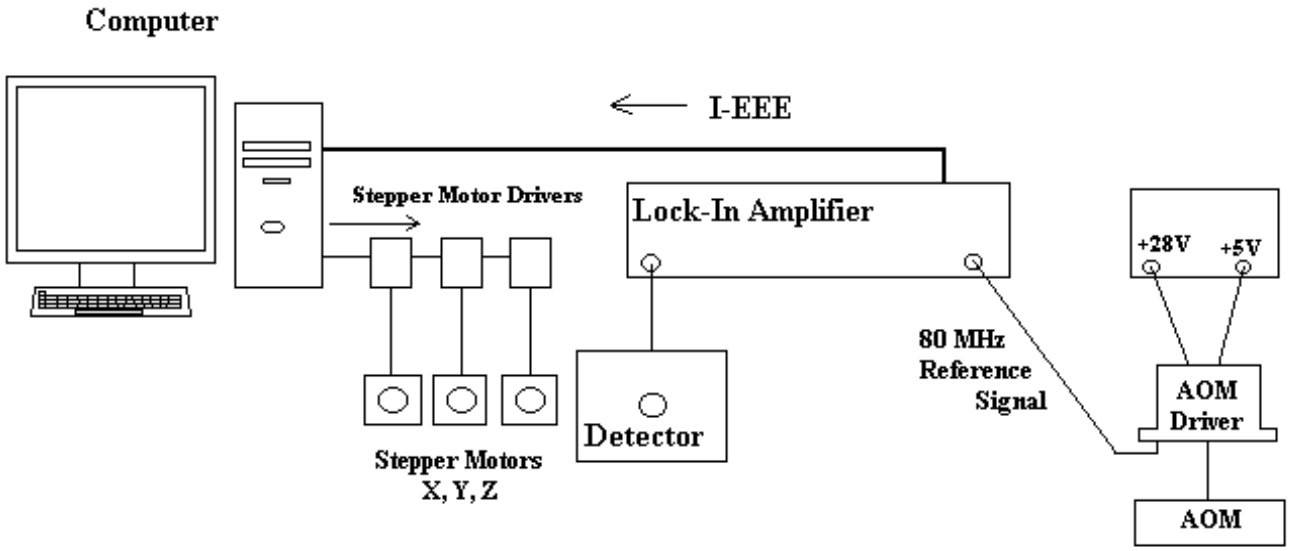
Major equipment:

- Floating Optical Table
- Low Coherence-Length Diode Laser
- 80-MHz Acousto-Optic Modulator (AOM)
- High-Frequency Lock-In Amplifier (SRS 844)


BE1
AOM
80 MHz to
lock-in reference
BS1
BS2
BE2
SC
PH
PD
Laser
TS1
To lock-in
signal input
TS2

Progress so far

- Built interferometer using visible laser
- Assembled hardware
  - Computer
  - Lock-In Amplifier
  - Stepper Motors
- Written software for control and data acquisition
- Obtained preliminary data


Computer
I-EEE
Stepper Motor Drivers
Lock-In Amplifier
+28V
+5V
80 MHz
Reference
Signal
AOM
Driver
Detector
Stepper Motors
X, Y, Z
AOM

Next steps

- Switch from visible to IR laser
- Develop algorithms for image “quality”
- Measure image quality as function of scatterer size and concentration
- Measure image quality as a function of reflectivity
- Attempt 3-dimensional imaging

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