Introduction to Magnetic Resonance Imaging

- Image Artifacts -

RF Detector

Banding, lines, zippers in an image.
Check cables, shielding, and be sure scan room door is closed.
Call service representative.
**$B_0$ Inhomogeneity**

Four straight glass tubes filled with water and placed in a square.

**Gradient**
RF Inhomogeneity

Dental Work

Surface Coil

Motion
Flow

Blood excited in a slice flows out by the time signal is detected from the slice.

In multislice images, some vessels may be bright and others dark.

Pulsating Flow

Blood Vessel  Artifact
Chemical Shift

\[ CSA = \frac{\nu_o N (\delta_{water} - \delta_{fat})}{BW} \]

- CSA = Chemical shift artifact in pixels
- \( \nu_o \) = operating frequency of imager
- N = number of pixels in the frequency direction
- \( \delta_{water} \) = chemical shift of water
- \( \delta_{fat} \) = chemical shift of fat
- BW = bandwidth (sampling rate) of imager

Partial Volume

A loss of image information when the voxel becomes larger than the imaged detail.

Thk = 3 mm

Thk = 10 mm
Wraparound

Outside FOV

Breast

FOV

Wraparound

Solutions: Increase FOV
  Move center of image
  Use no phase wrap

Gibbs Ringing

Banding of the intensity around sharp edges when a small acquisition matrix is used.

Corner of rectangular object in 512x128 image.