

Martin Lindquist

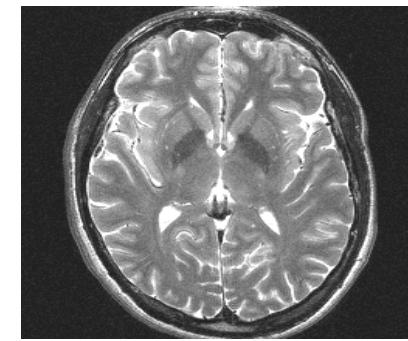
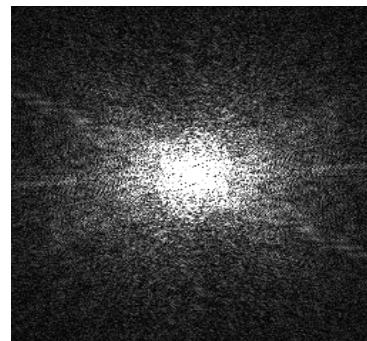
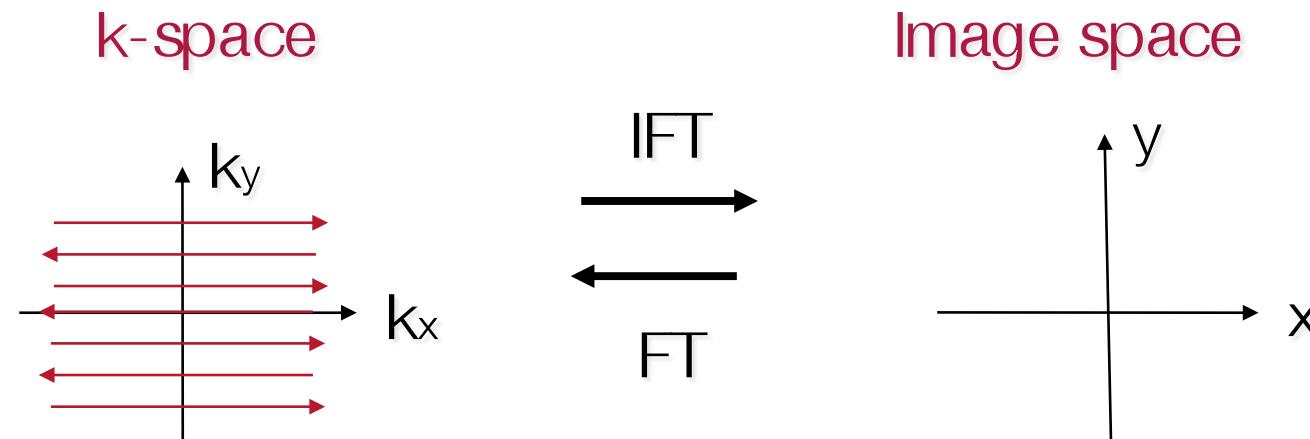
Department of Biostatistics
Johns Hopkins
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Tor Wager

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University of Colorado, Boulder

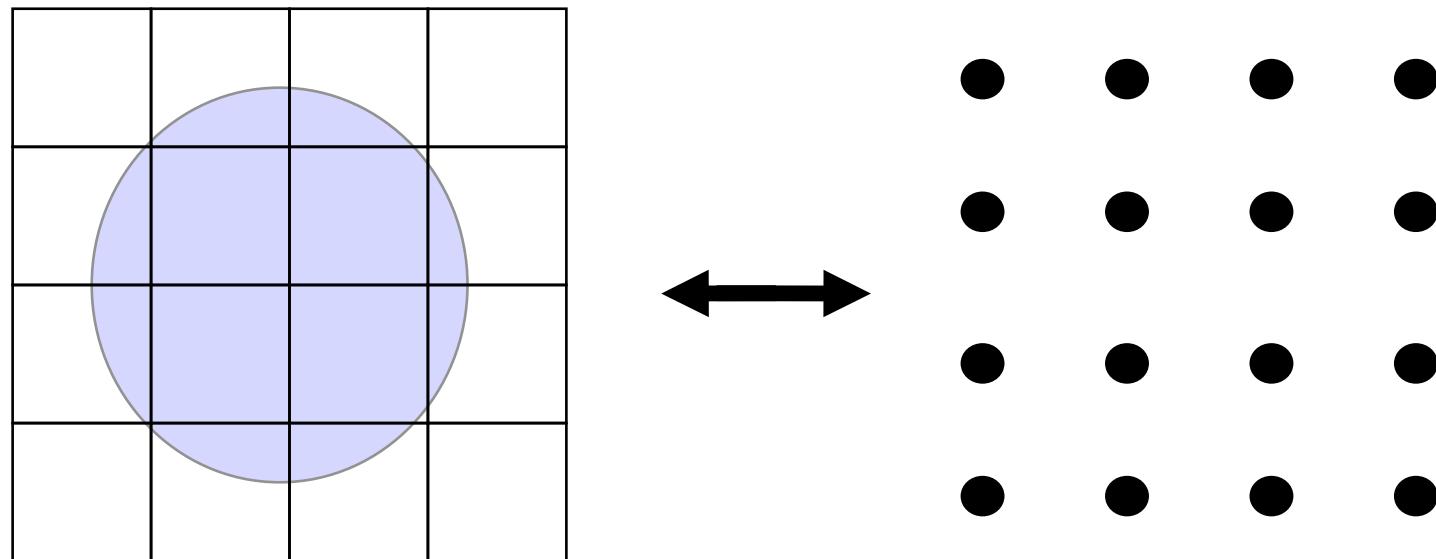
K-space

Image Formation



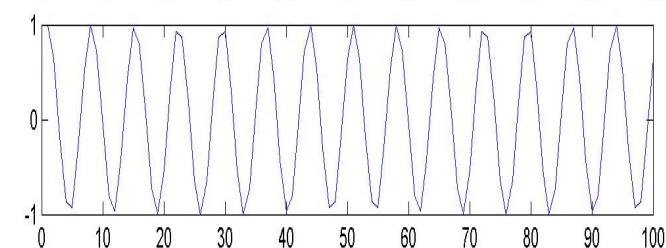
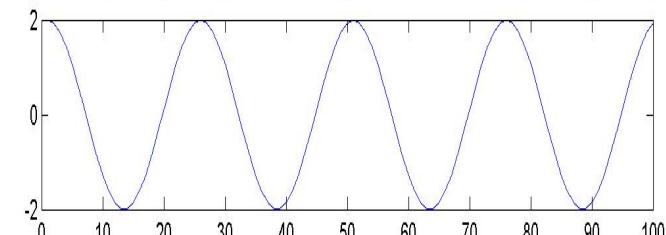
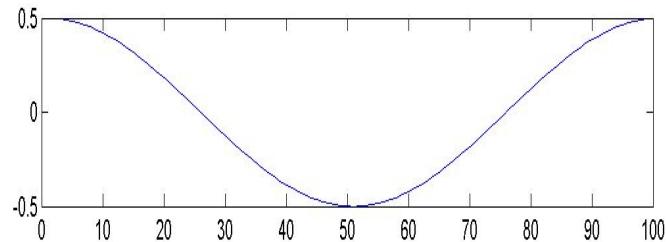
K-space

It is important to note that there is not a one-to-one relationship between image and k-space.

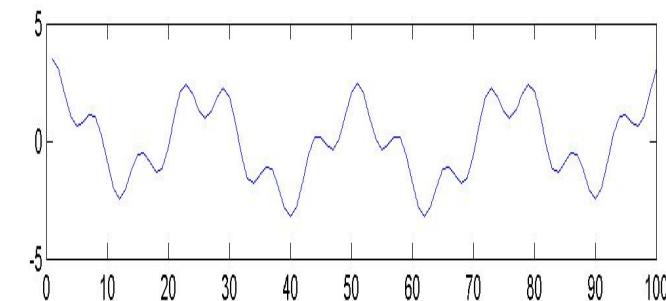


Each individual point in image space depends on **all** of the points contained in k-space

Superposition of curves



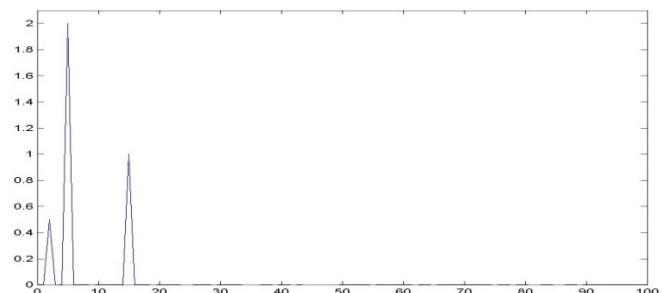
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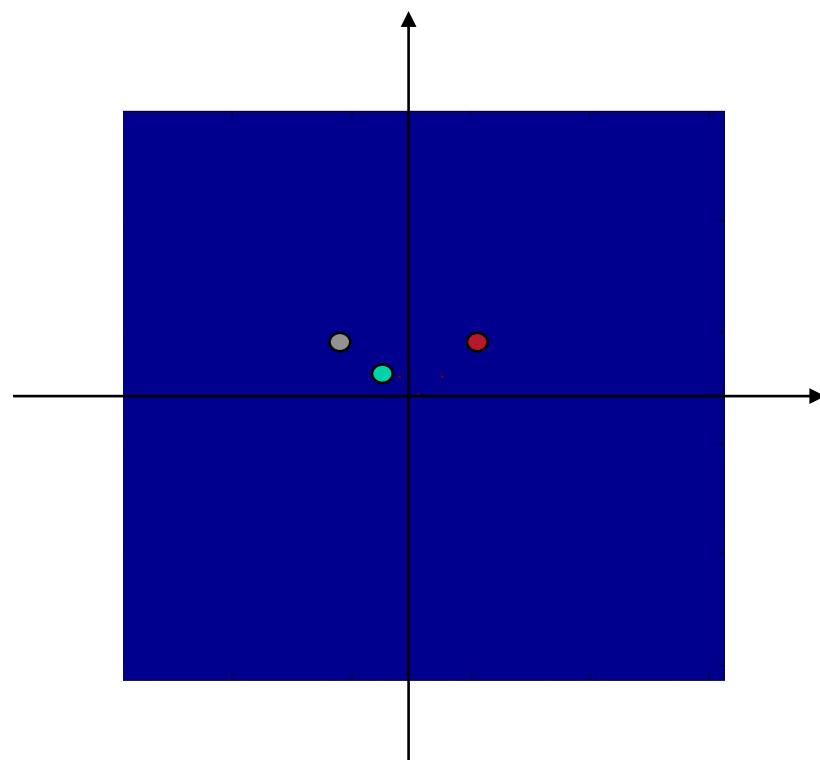
1 Dimension

Period: T

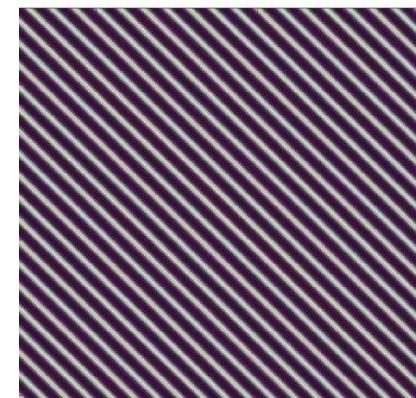
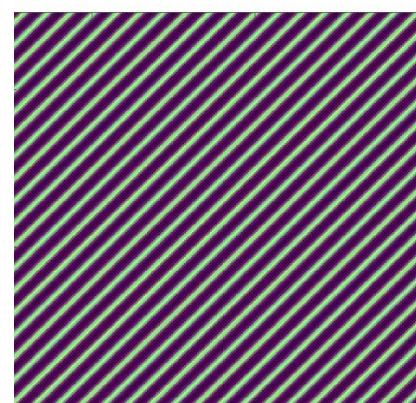
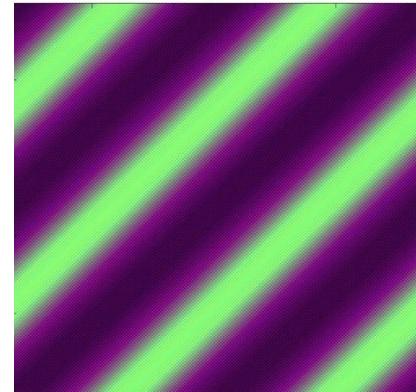
Frequency: $\omega = T^{-1}$

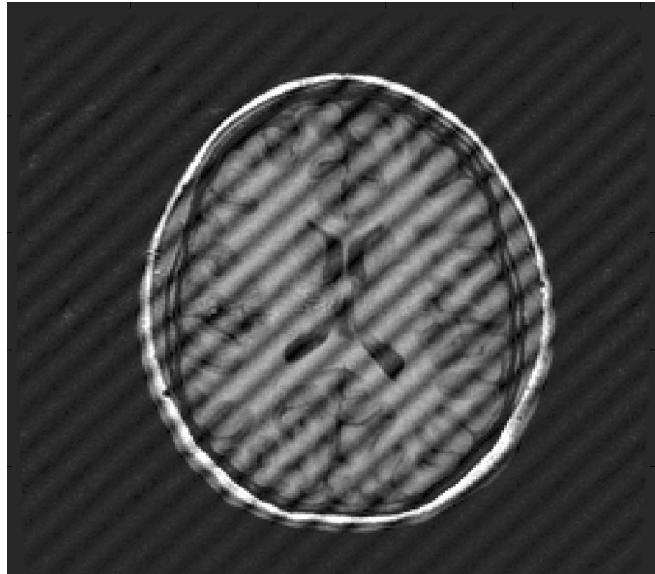
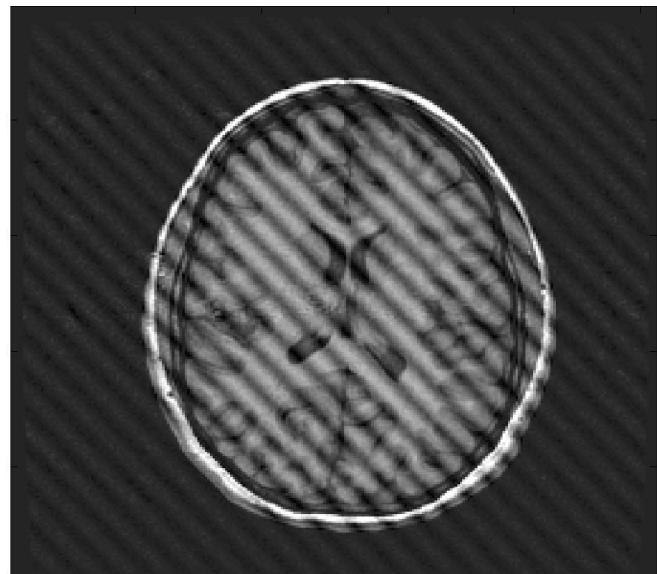
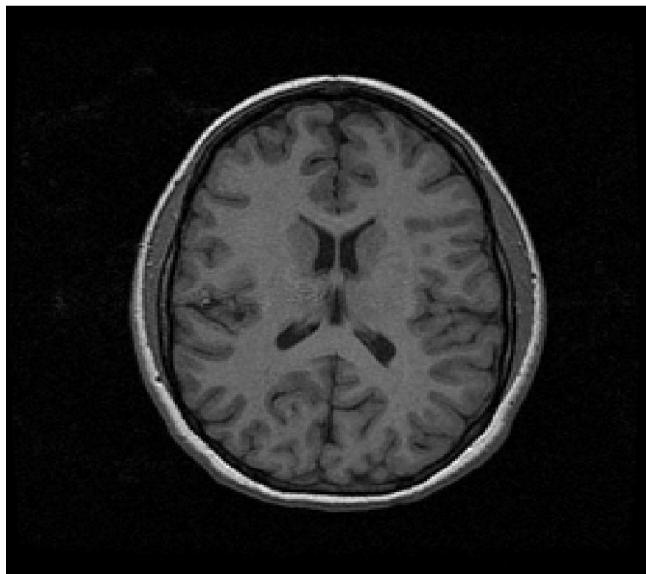
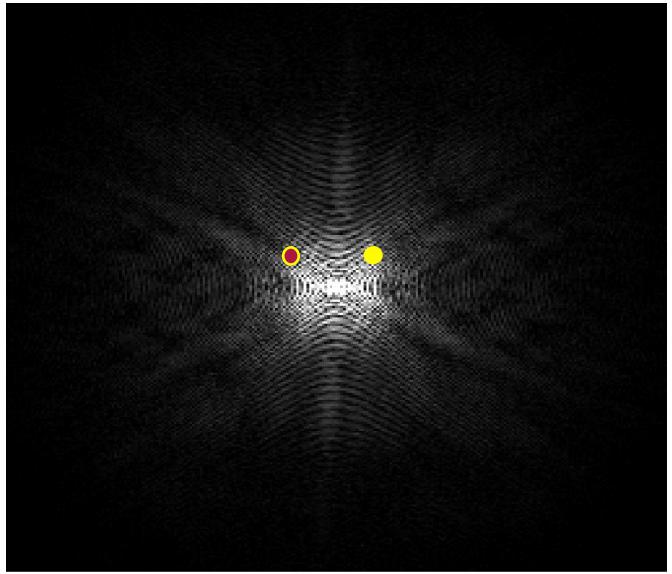


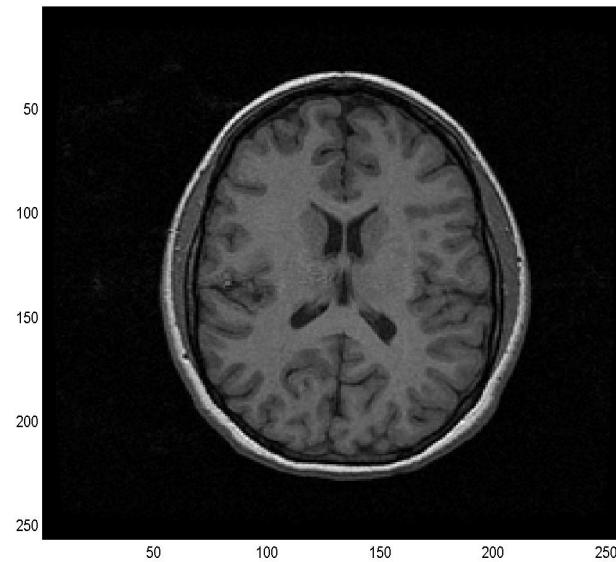
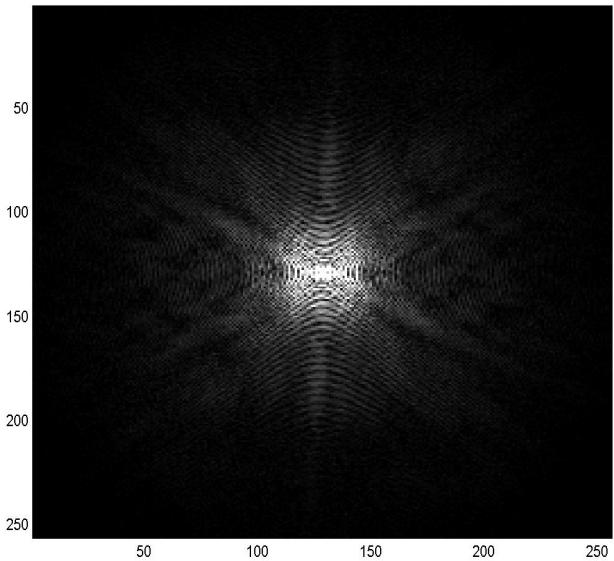
2 Dimensions

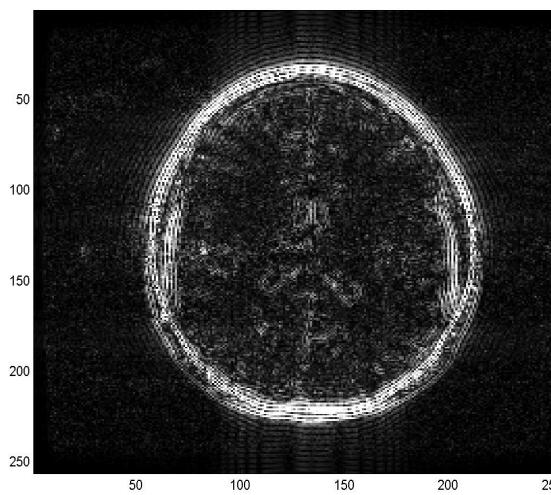
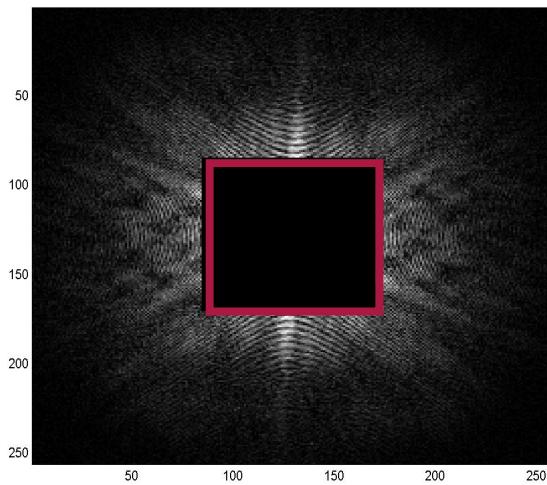
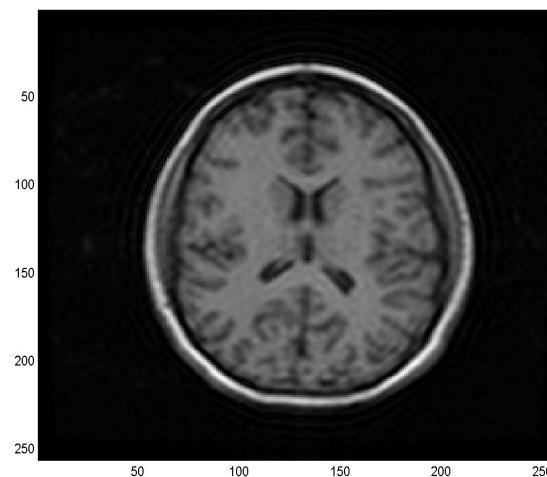
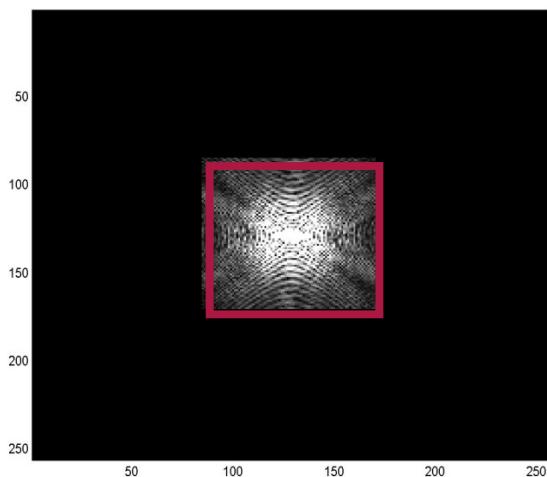


K-space







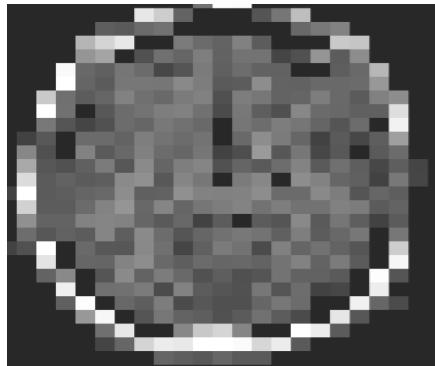


Information content in k-space

- Low spatial frequencies represent parts of the object that change in a spatially slow manner (Contrast).
- High spatial frequencies represent small structures whose size is on the same order as the voxel size (Tissue boundaries).



Spatial Resolution



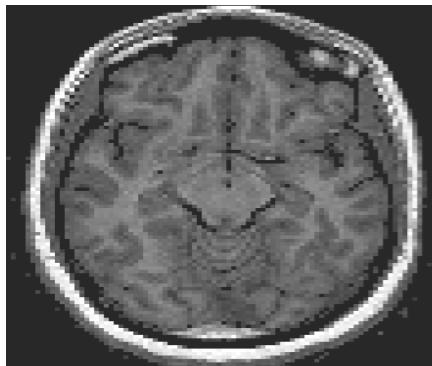
32×32 image

1024 points sampled in k-space



64×64 image

4096 points sampled in k-space



128×128 image

16,384 points sampled in k-space

End of Module



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