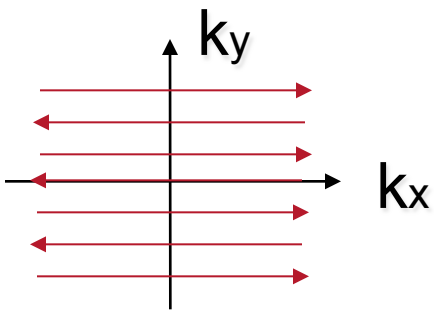
# Module 4:
# K-space

# Image Formation

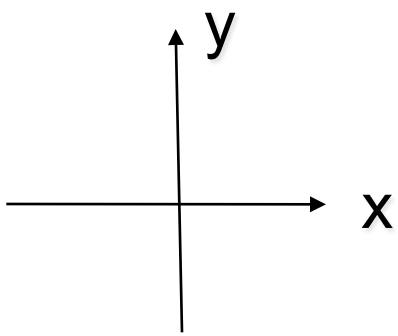
k-space

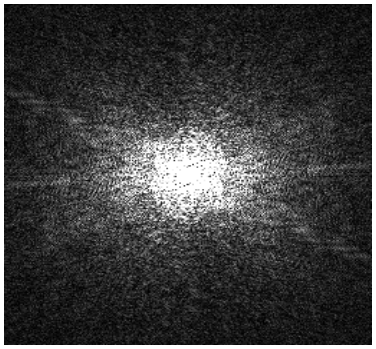


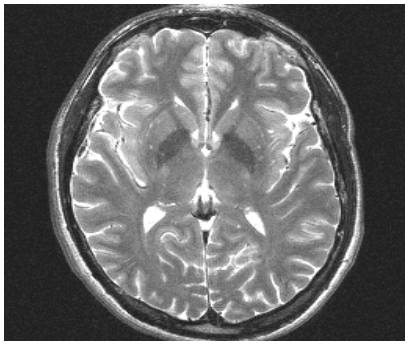

IFT

FT

Image space

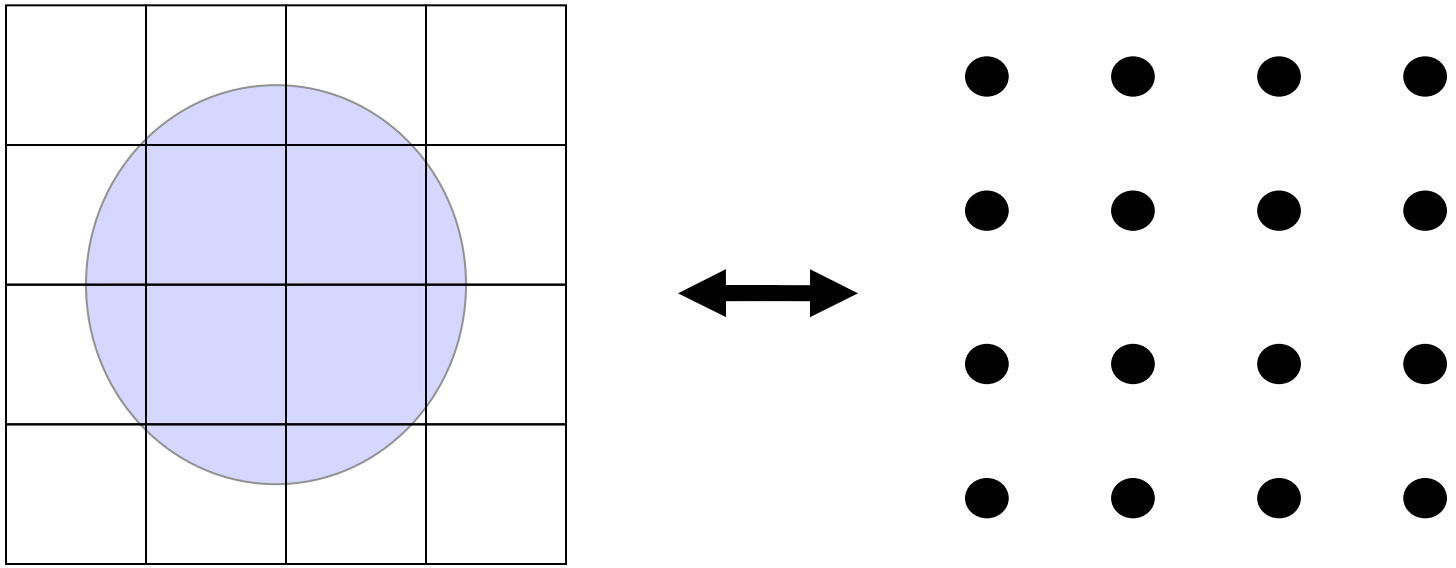




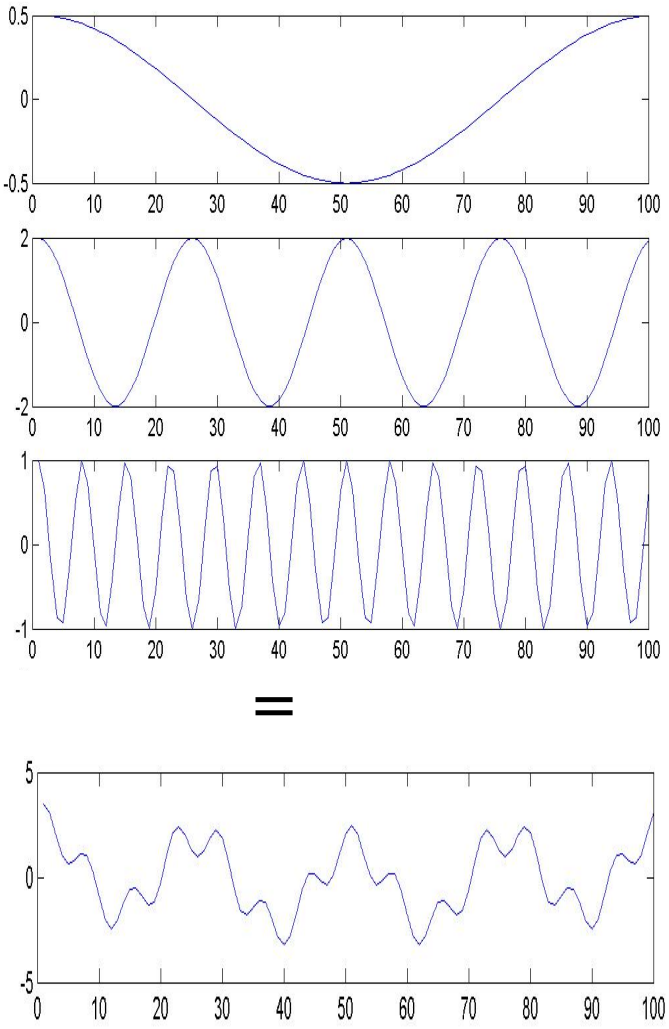
# K-space

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 the k-space

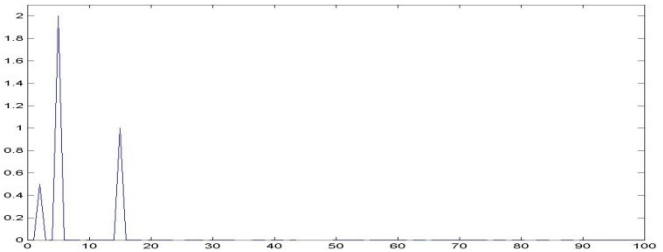
# Superposition of curves



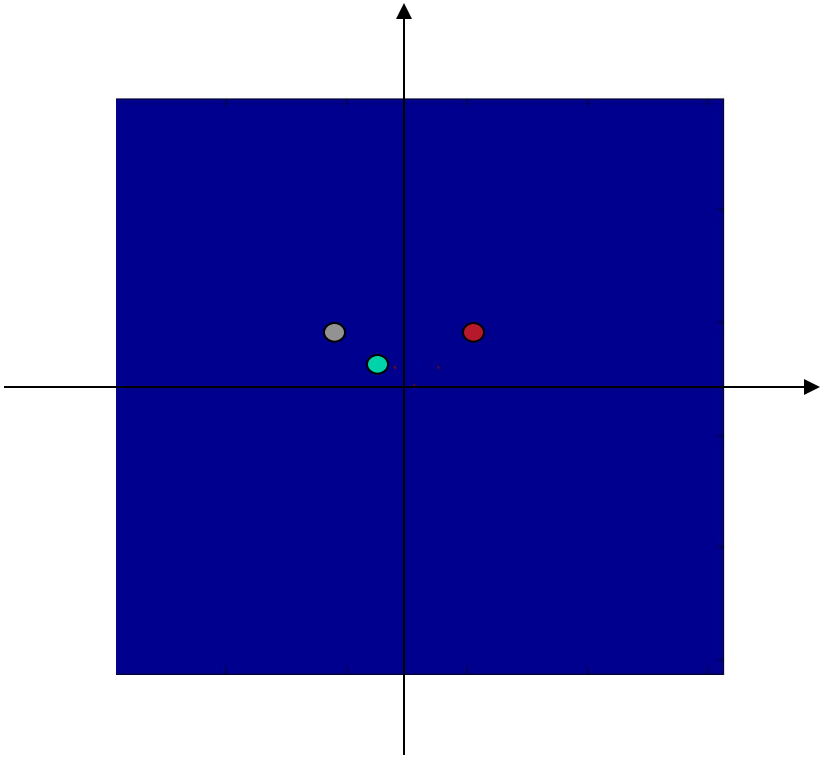

1 Dimension

Period: T

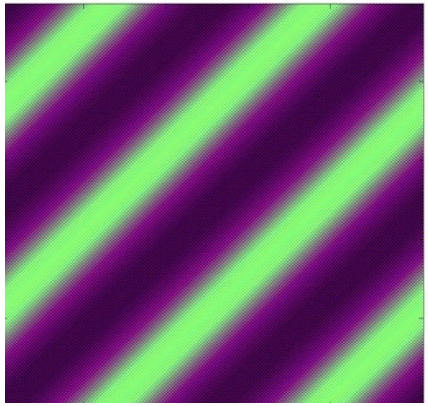
Frequency: $\omega = T^{-1}$

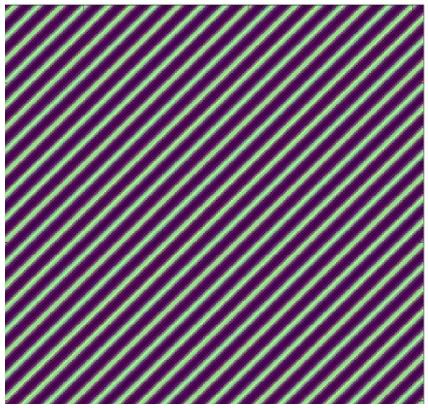


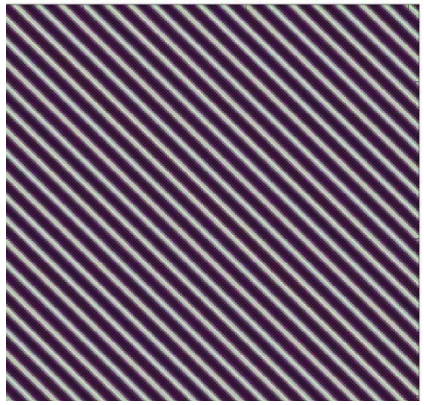
# 2 Dimensions

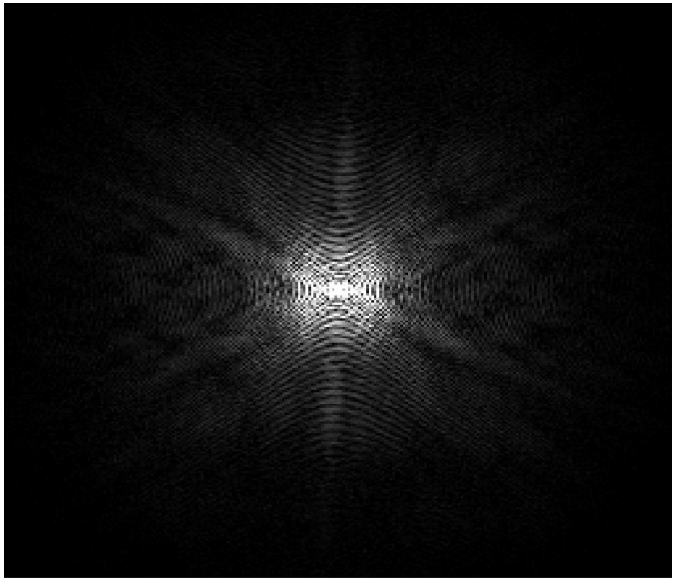


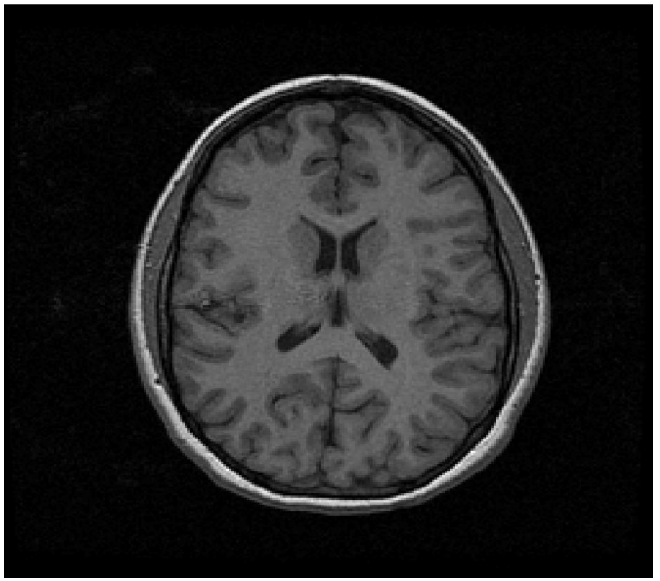
K-space

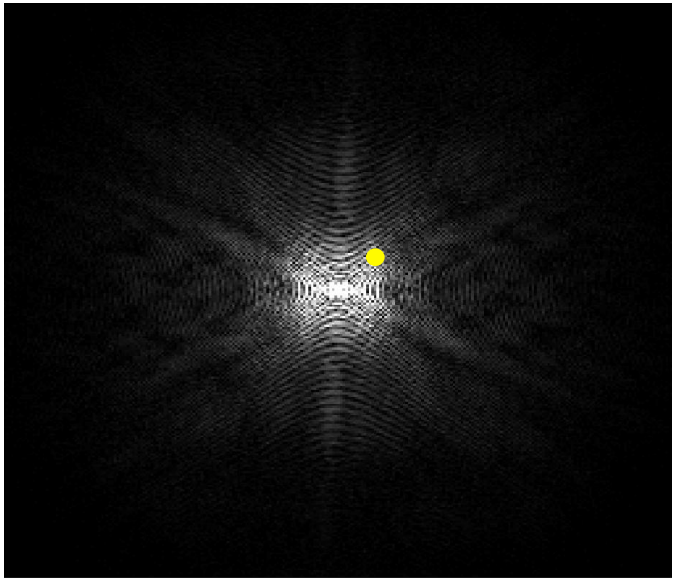


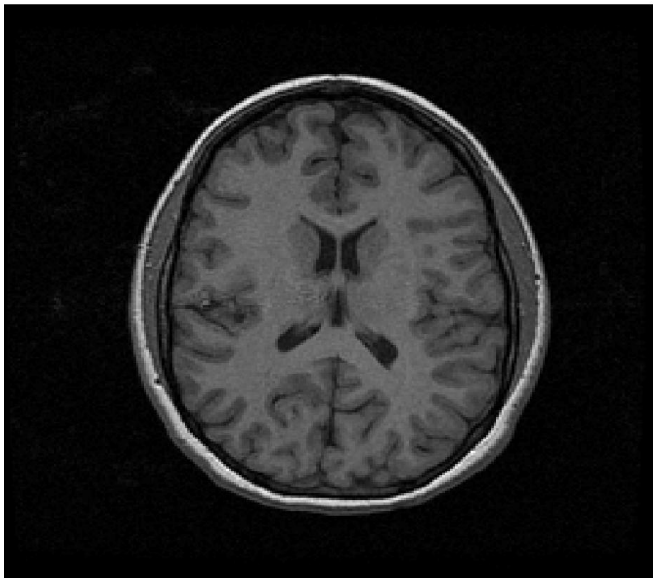


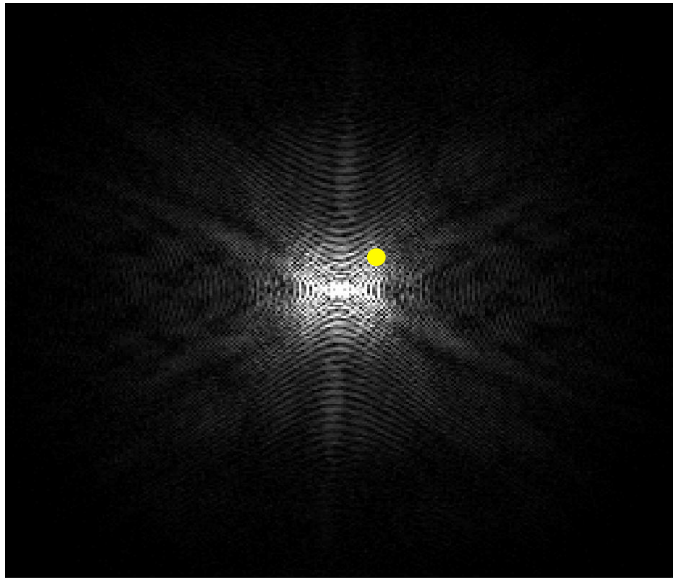


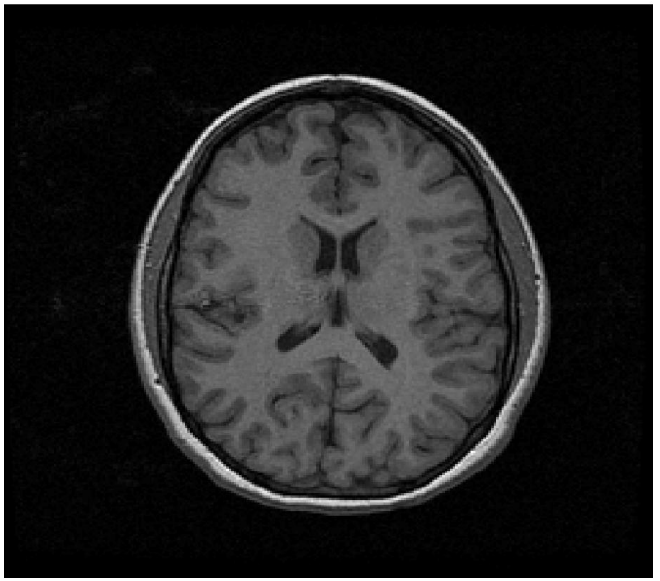


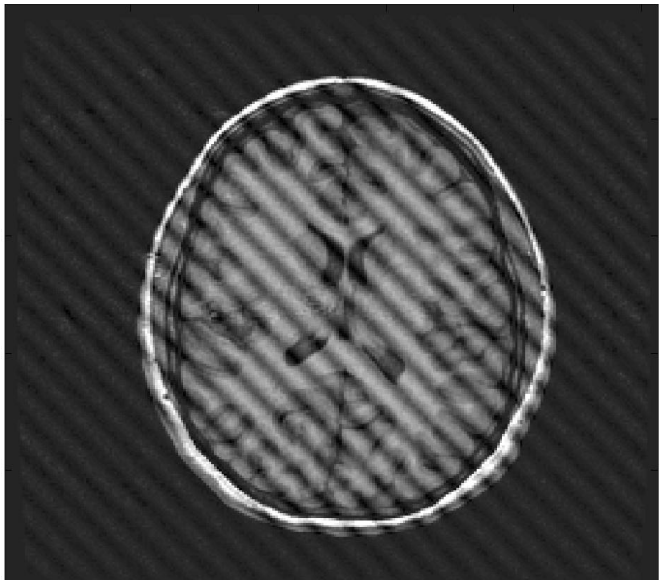


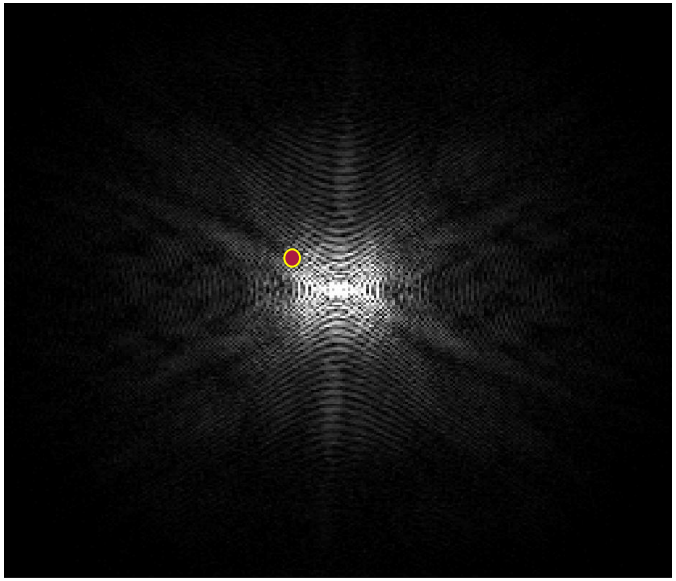


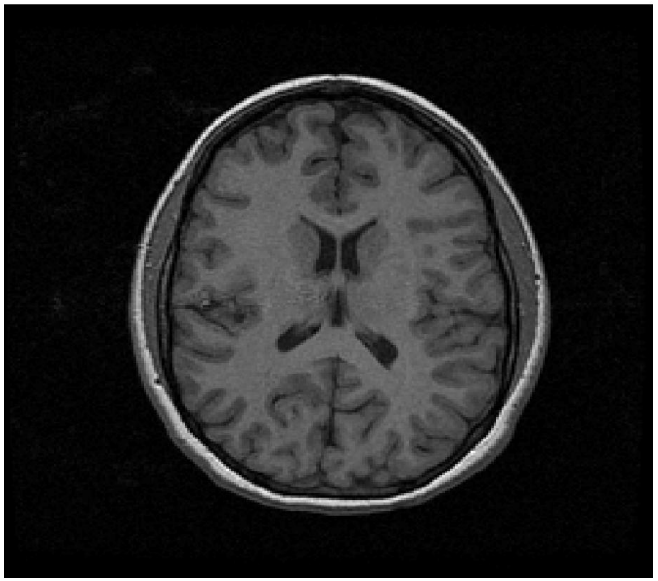


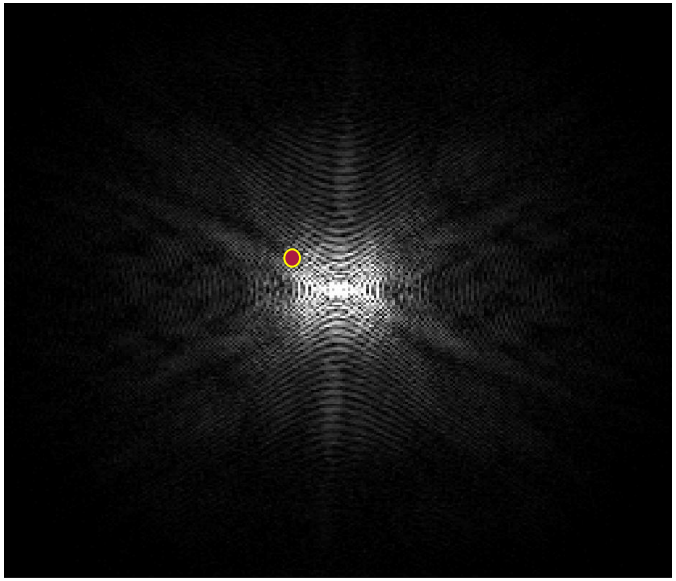


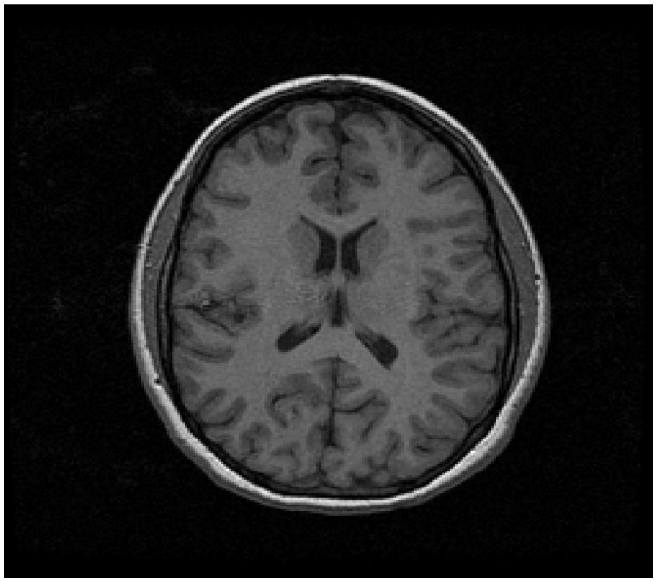


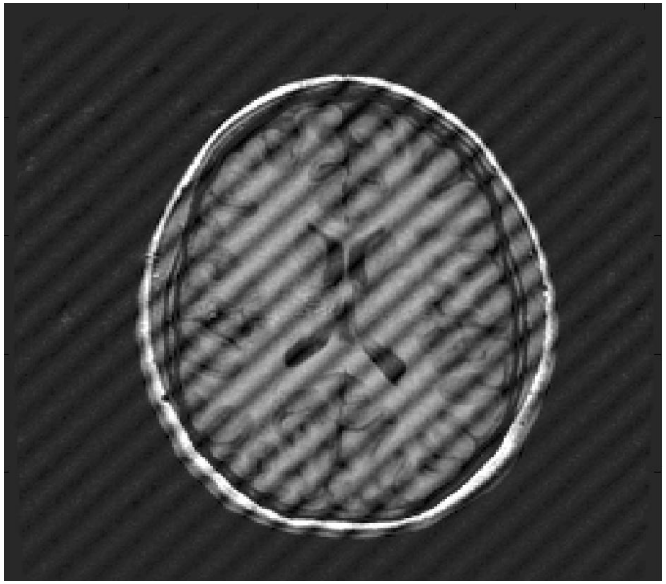


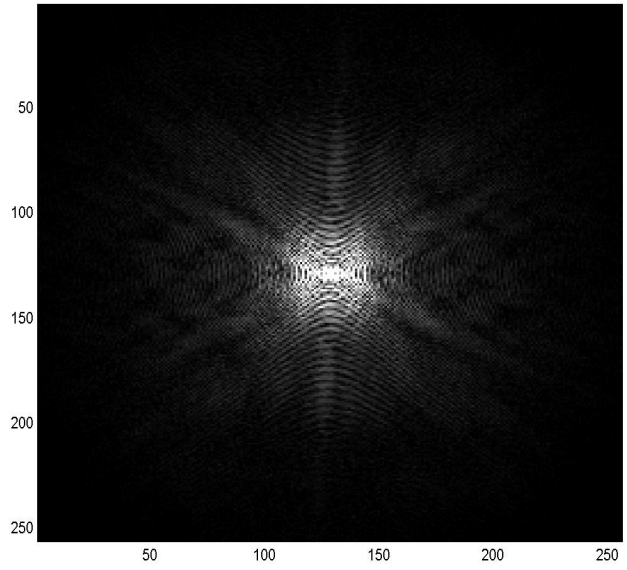








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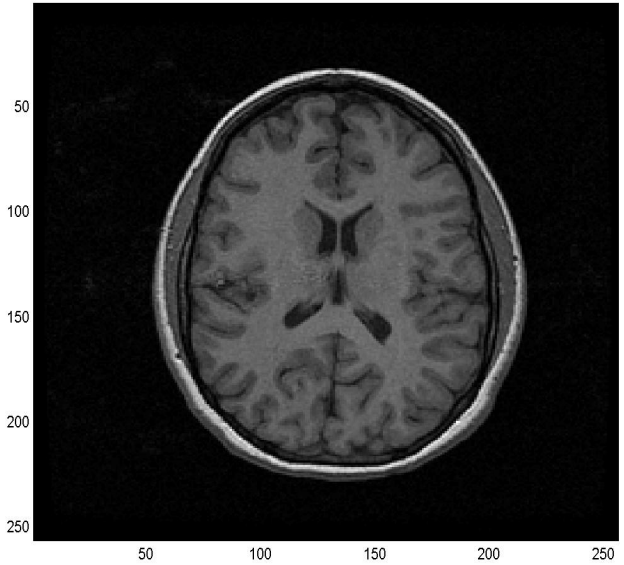
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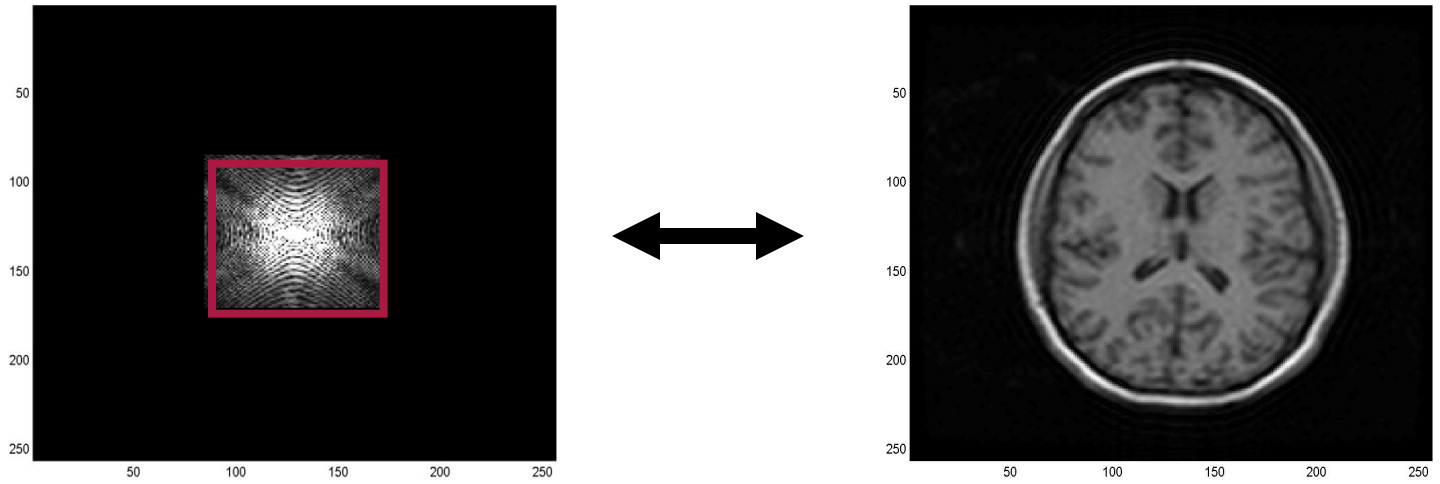
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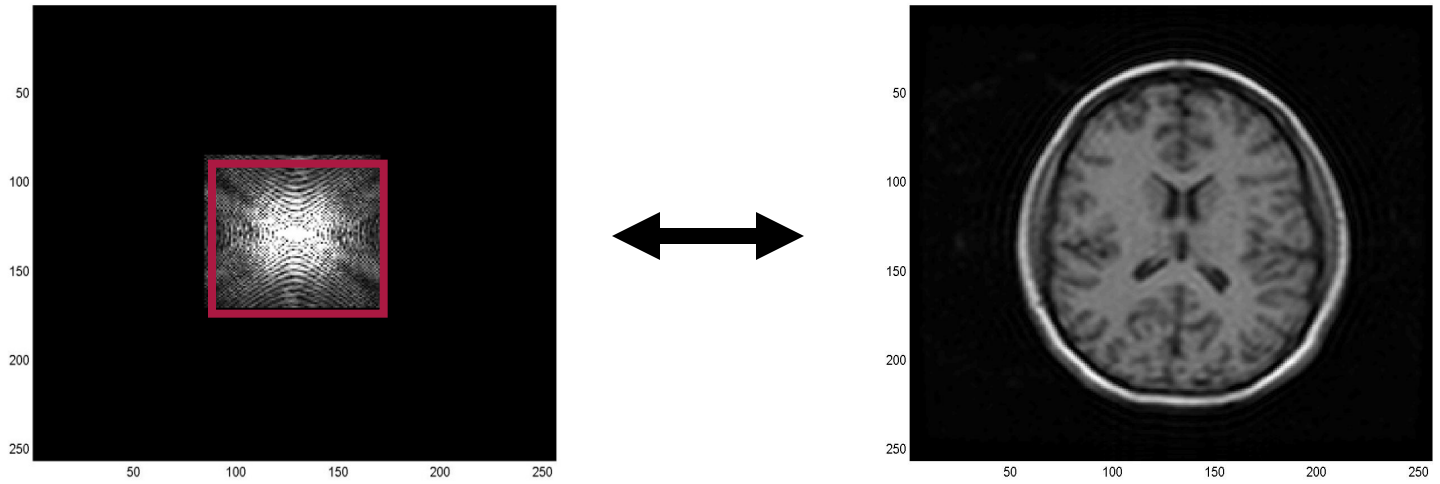
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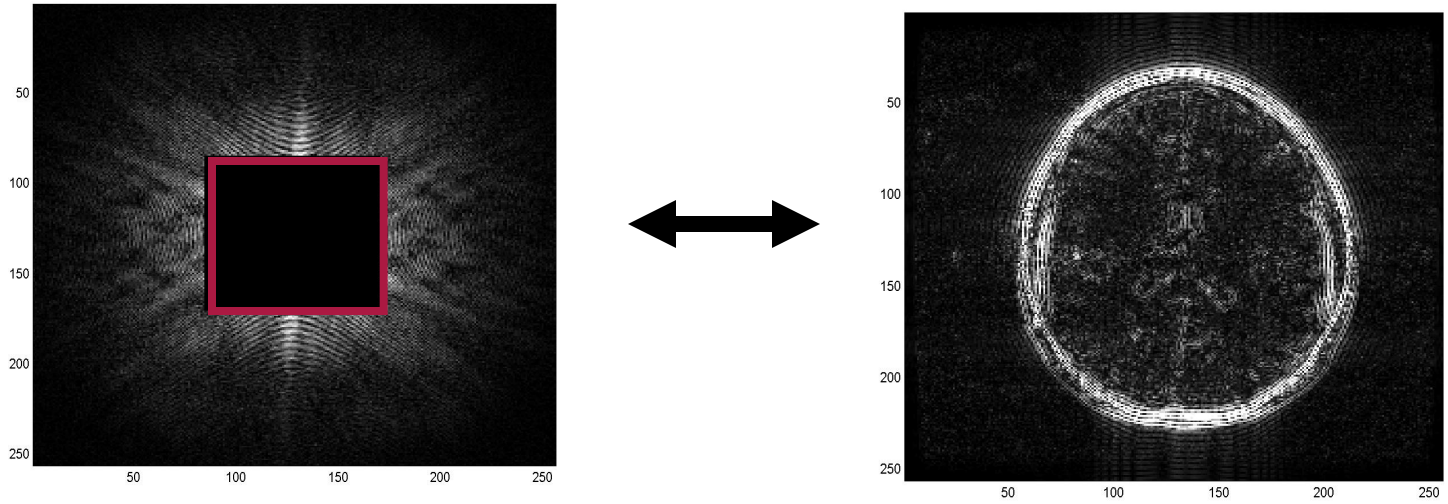
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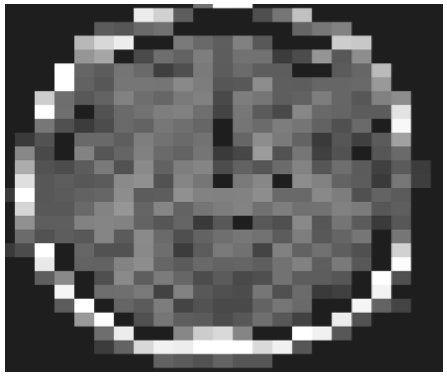
# Information content in k-space

- Low spatial frequencies represent parts of the object that change in a spatially slow manner (Contrast).

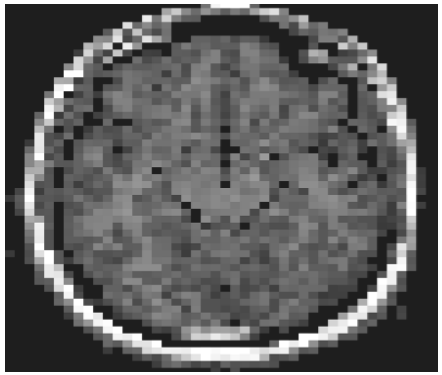
- High spatial frequencies represent small structures whose size is on the same order as the voxel size (Tissue boundaries).

# Spatial Resolution



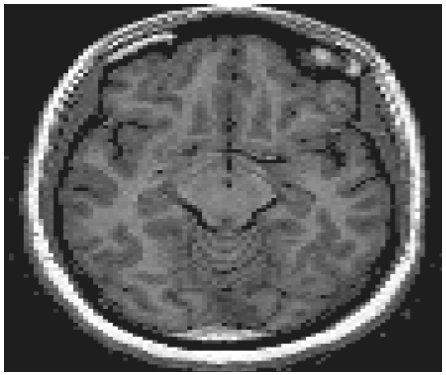
32 × 32 image

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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