Consider the two 512 x 512 luminance (8-bit) images below, named “Landsat” and “Girl”.

![Original Landsat Image](image1.png)

![Original “Girl” Image](image2.png)
Next, take the two-dimensional Fourier transform of each image. The magnitude and phase look as follows.

Girl DFT Magnitude

![Girl DFT Magnitude Image]

Landsat DFT Magnitude

![Landsat DFT Magnitude Image]
Girl Image DFT Phase

Landsat Image DFT Phase
Next, consider synthesizing an image using only the transform-domain magnitude information, or only the transform-domain phase information.

Magnitude Only: Use DFT magnitude, but set phase to a constant (zero).
Girl Image With Only DFT Magnitude Information (Zero Phase)
Girl Image With Only DFT Phase Information (Magnitude = Constant)

For reference, the original Girl image is shown below (at reduced size to fit on page).
Finally, consider “mixing” the Landsat and Girl images in the transform domain: Reconstruct using the **Magnitude** for the Landsat DFT and the **Phase** of the Girl DFT.

Mix in DFT Domain of Magnitude of Landsat and Phase of Girl Images
Reversing the mixture, so using the Girl image DFT magnitude and Landsat DFT phase:

![Mix of Girl DFT Magnitude and Landsat DFT Phase](image1)

For reference, the original Landsat image (scaled down in size) is below.

![Original Landsat Image](image2)