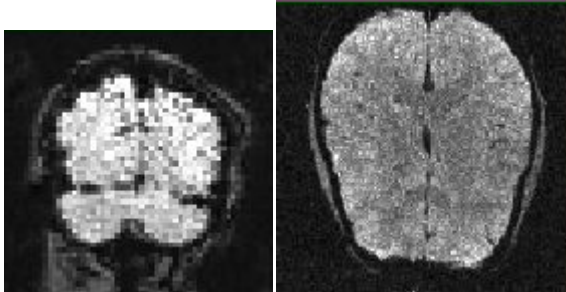


HW9: Answer Key

The assignment was to calculate SNR maps for a low-resolution and a high-resolution dataset, then describe the two maps. On the left, the 3 mm SNR map (max SNR: ~80); on the right, the 1.5 mm SNR map (max SNR: ~40)



The SNR map for the low-resolution dataset shows lower SNR in the gray matter. This is the expected result if physiological noise is the dominant noise source, since gray matter has higher physiological noise levels (more vasculature, more uncontrolled cognitive processes, etc.). The SNR map for the high-resolution dataset shows the same noise levels throughout the brain. This is the expected result if thermal noise dominates, because thermal noise is a property of the electronics (coil, cables, amplifier) rather than the sample (brain).

In general, the SNR in large voxels (which have more signal and therefore higher thermal SNR) is limited by physiological noise, whereas the SNR in small voxels is limited by thermal noise. Note the factor of 2 difference in the SNR values between the low-res and high-res data.