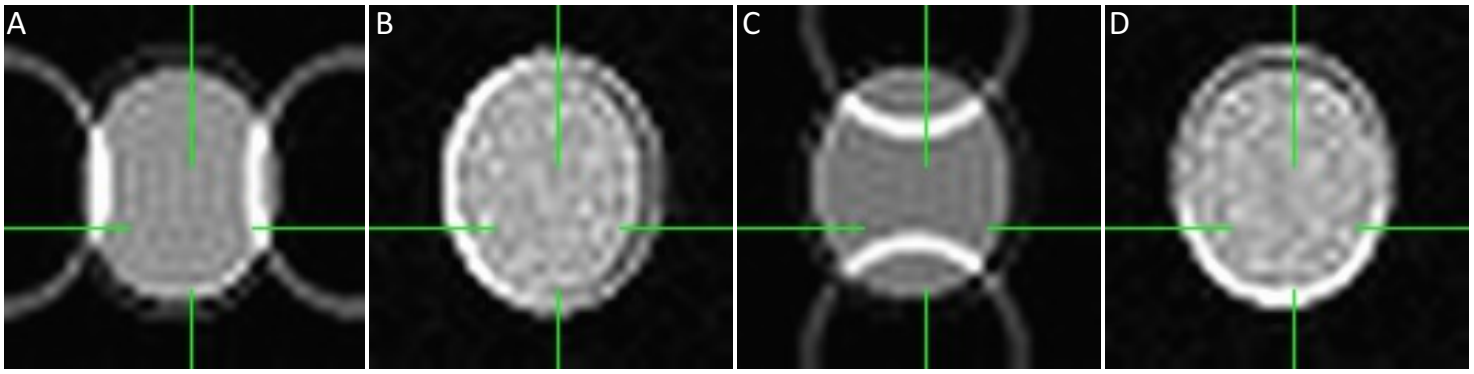

The four images above were simulated with the same sampling bandwidth and read-out gradient strength. The "sample" for the simulation was a water balloon coated in fat, so the ring around the outside of the sample resonates at a different frequency from the water.

Question 1: Which 2 were acquired with a FLASH pulse sequence, and which two were acquired with an EPI pulse sequence?

B and D were acquired with FLASH. You can tell because the chemical shift artifact is small (for a matched read-out time).

Question 2: Which 2 were acquired with a left/right phase-encode direction, and which 2 were acquired with a anterior/posterior phase-encode direction (assuming that these are axial slices, so the top of the image is "anterior")?

A and D were acquired with a RL phase-encode. You have to know whether it's FLASH or EPI to decide which direction is PE, since the biggest shifts go in the PE direction for EPI but RO for FLASH.

Question 3: Describe, in your own words, in 1 or 2 sentences, what is happening to make the fat ring show up at the wrong place in the image.

Key idea: the protons there are resonating at a different frequency from what is expected (for water), and images are basically maps of how much signal was at what frequency.