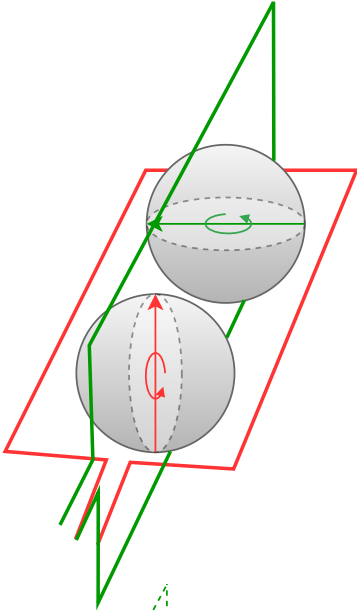
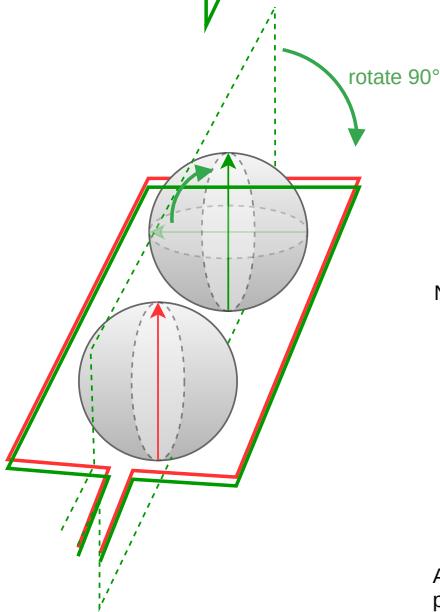


Given are two cores using an anisotropic magnetic material meaning their domains can only align in the shown dashed plane. Importantly both cores have a significant distance between them as to ignore any core-core mechanical interaction.



Now add two coils around these cores that are orthogonal to each and apply a current and bring both cores to saturation. Due to the anisotropy of the cores a single coil can only affect the alignment and saturation of a single core.



Now keep one core/coil pair fixed and rotate the other pair 90° around as to align both pairs.

Assuming the cores both have a relative perm. of 2 and saturate at 1A producing 2Wb of flux each at 1A. The following interactions will occur:

1. electrical input for energising the coils:
 1. $2 \times 1\text{A} \times 2\text{Wb} \times 0.5 = -2\text{J}$
2. While rotating and maintaining constant current:
 1. electrical input from source: $2 \times 1\text{A} \times 2\text{Wb} = -4\text{J}$
 2. Mechanical work gained: $+4\text{J}$
3. electrical output from deenergising the coils:
 1. $2 \times 1\text{A} \times 4\text{Wb} \times 0.5 = +4\text{J}$

There is a gain of +2J in the complete cycle.