July 7th

Just a note that I will not have notes uploaded for tomorrow July 8th because I have an interview for grad school. I have attached the lab work to this paper. We skipped around a lot in lab. The math may not be exactly correct.

Chapter 19

Demos:
- any wire with a current is surrounded by a magnetic field - magnetic field is caused by a current
- charge in that current have a magnetic field
- actual magnetic pole is deep into the earth - dip angle of the Earth.
- each side of the magnet still has a N/S pole when you split one big magnet
- center of dish has lowest energy - when field is turned on, but separate when field is off
- right hand rule: conventional current (in the direction of)
- iron core in solenoid increases the magnetic field
- when currents flow in the same direction, they magnetic fields attract
- magnetic field can be shielded and rerouted
- para magnetism ≠ diamagnetism - weak
  ↳ copper sulfate ↳ bismuth
- temperature has an effect on magnetic field
  - a temp above the curie level destroys magnetism
★ — how do you make 2 magnets out of one magnet?

Magnetism

19.1 Magnet, Magnetic Pole, and Magnetic Field Direction

- magnetic dipole - all known magnets are dipoles
- magnetic field is created by a magnet → direction of a magnetic field (B) at any location: the direction that the north pole of a compass would point if placed at that location

Important

  ↳ the N point of the magnet points to the N, but because there is a south magnetic field
- At any location, the direction of the magnetic field is tangent to the field line or equivalently to the way the N needle poi

19.2 Magnetic Field Strength and Magnetic Force
- uniform magnetic field — horseshoe magnet, U-shaped
  N to S the field lines go
- a moving charge produces its own magnetic field
- change the direction or speed by creating a net force
  ↳ right hand rule. thumb on positive test charge

- magnitude of force: SI unit Tesla T
magnitude of field $B = \frac{F}{qv}$ ↳ $F = BqV$ (N)

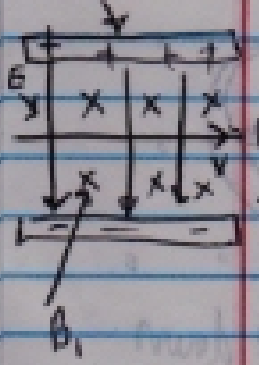
10,000 Gauss = 1 Tesla

* In general, if the particle is moving at an angle to the field $F = qvB\sin\theta$
  ↳ the force is perpendicular to velocity and the field
  • want largest force then we want right angles (perpendicular)

B - the charge - must have charge, velocity and a magnetic field to is affected by have a force
moving through
the other magnetic field, "B" is not the magnetic field of the charge

19.3 Applications: charged particles in Magnetic Fields
- a cathode ray tube, such as tv, uses a magnetic to direct a beam of electrons to different spots on a fluorescent screen, creating an image. → resolution came into factor

velocity selector



• a velocity selector consists of an electric & magnetic field at right angles to each other. Ions entering the selector will experience an electric force $F_E = qE$. and a magnetic force $F_m = qvB$. these two forces will be perpendicular to each other