Outline of Tom's meetings with Alfredo

Late March:
- Background on LHC, why we're looking for DM, problems with Standard Model
- Introduce SUSY theory
  - each SM particle gets a "superpartner"
  - good because it gives a candidate for DM (Neutralino-1)
- What makes a good DM candidate?
  - Weakly interacting
    - does not interact with light
    - known from Astronomical evidence
  - Must be stable
    - must have been created in the early Big Bang, must be stable in order to still be around
  - Must be massive, ~100 GeV
- compare to most massive SM particle, top quark @ ~170 GeV
- Basic theory behind what we're doing at the LHC
- Smash protons together so hard that they blow up into all kinds of particles, hopefully including SUSY particles
- Detectors can see most SM particles, will have to rely on conservation of momentum and the energies we can see to deduce what we can't detect.

Early April:
- Decay chain we were looking for.
- \( p + p \rightarrow ... \rightarrow q + q + \tau^{+} + \tau^{-} + \text{MET} \) (hopefully neutralino-1)
- Define terms which affect how many good events we get
  - Branching Ratio
  - Luminosity
  - Cross Section
- Define N-Tuple
- Cuts we should make to eliminate bad events:
  - 1. Final state should be 2 \( \tau \), 2 jets, MET
  - 2. Require some minimum for MET
  - 3. Require a minimum energy for the \( \tau \)s
- What jets look like in detector

April 18:
- What energy signature we're looking for (2 jets, 2 \( \tau \), MET)
- Need to construct observable to try to find neutralino-1 (CDM) mass.
  - Relativistic calculations to find formula for invariant DiTau mass, which we can use to find neutralino-1 mass.
April 25:
- What we use to generate events (ISAJET), how “detector simulator” would affect data, mimic effects of B field at LHC.
- Position, Energy both affected by detector resolution
- Define terms
  - Parton, Hadron, Eta, NTAUS, Idtau, EtaTau, Phitau, VIS, TRUT
    (terms used in program)

Early May: Removing Background noise, isolating good events through cuts, OS v. LS taus for DiTau masses, other events that might have same energy signature as good events and thus mess with data.