Thesis outline

1. Introduction
   1. High harmonic generation
      1. 3-step model
      2. phase matching
         1. pressure-length product
   2. Transient absorption spectroscopy
   3. Charge dynamics in condensed matter
2. Vacuum apparatus design
   1. General considerations
      1. Vacuum
      2. Refocusing – ellipsoid vs toroid
      3. Modular design
   2. Fred simulations (ellipsoidal mirror)
   3. Resolution target (need to take data)
   4. Knife edge measurements for XUV
3. High pressure cell
   1. Phase matching calculations & experiment
   2. Pressure / density-dependence of HHG (CO2)
4. Transient absorption experiment
5. Conclusion