1. Preface
    (a) Quantum materials are really cool
    (b) Correlated systems are really cool
    (c) Probably the most exciting systems right now
    (d) What are the major questions?
    (e) Description of the book - dissemination of results, and instruction manual
2. Introduction to ultrafast optics in correlated electron systems
    (a) Correlated systems - an overview
    (b) Important aspects of correlated systems for this thesis
        i. Charge density wave (example: $1\,T$-TaS_2)
        ii. Kondo effect and Magnetic order (example: $CaMn_2Bi_2$)
        iii. Multiferroics (example: $CuBr_2$)
    (c) Spectroscopy versus control
        i. Ultrafast spectroscopy
            A. Comparison of nonequil. vs equil. spectroscopy
            B. Excitation of coherent collective modes
            C. In multiferroics
        ii. Ultrafast control
            A. Incoherent versus incoherent control
            B. In magnets
3. SHG theory
    (a) Space groups and point groups
    (b) Response tensors
        i. Multiple contributions to SHG
    (c) Symmetry of tensors - the free energy
        i. SHG does not mean inversion broken
        ii. Presence of absorption
    (d) Bond model
    (e) Phenomenological GL model of SHG
        i. Free energy is p dot e
        ii. Free energy for SHG can be written like ...
        iii. $\chi_{ijk} = \chi_{ijkl}O_l$ (but fully general) is a valid expression for the free energy
        iv. Free energy needs to be a real and totally symmetric scalar
        v. This gives us constraints on χ_{ijk}.