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: 1T-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. 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) Phenomenological GL model of SHG
    (e) Quantum model
        i. Wavelength dependence of SHG
4. SHG practical
    (a) Basic idea
    (b) Before you build the setup
        i. Choice of oblique vs. normal incidence - which tensor elements do you want to probe?

ii. Scaling of SHG signal with volume, pulse width - microscopy or not? Domain size?

(c) Construction of the setup

i. Description of the setup that we built
ii. Better to use hollow bore stepper motors
iii. Choice of detector

(d) Considerations for time-resolved

i. Location of pump mirror
ii. Alignment of normal incidence
iii. Choice of pump wavelength (OPA)
iv. Polarization rotation (why do it?)
v. Pump scatter

(e) Data analysis (static)

(f) Data analysis (time-resolved)

5. Appendix A: Failed experiments