

III. Percussion Instruments:

- 1. Phase-Sensitive Measurements of Complex Modal Vibrations of Percussion Instrument(s) – e.g. Drums using UIUC P498POM P/U Nano-mics, Lock-in Amplifiers, Piezo Transducer + Function Generator and PC-Based Lab-Windows/CVI DAQ Modal_Vibes.prj Program as function of frequency and for various modes of oscillation, drum head types, drum tension, temperature, bearing edge type, other settings, etc.**
- 2. Study/Investigate the Harmonic Content and Decay Time(s) vs. Frequency of Percussion Instruments as a function of excitation method, drum head type, drum tension, other settings, etc.**
- 3. Investigate/Measure the Modal Vibrations of Isohedral Drums.**

IV. Acoustic Stringed Instrument Experiments:

- 1. Strings:**
 - Use Tektronix digital oscilloscope + FFT Harmonic Analysis of signals from strings, study & compare e.g. Nylon vs Steel.
 - Measure/compare decay times of strings - steel vs. nylon - fundamental & harmonics.
 - Study attack & harmonic content of picking techniques, and/or different types, sizes, shapes, and/or thicknesses of picks.
- 2. Necks/Tuners/Nuts:**
 - Use PC-based DAQ system to study & compare different necks, neck woods, fretboard woods, neck finishes, neck damping, FatHeads, nut materials, etc.
- 3. Bridges:**
 - Study/compare different types bridges, bridge materials – how affects sound.
 - Measure intonation e.g. on acoustic guitar or e.g. mandolin. Compare w/ e.g. intonation electric guitar. Study vs. string gauge and string type.
 - Compare intonation of guitar with Buzz Feiten tuning system installed vs. one without it.
- 4. Bodies:**
 - Studies of mechanical vibrational properties using PC-based DAQ system.
 - Study different kinds of wood/bracing/construction affect sound - measure frequency response, study/investigate resonances.
- 5. Acoustic Guitar Active Pickups/Controls:**
 - Compare the performance of various piezo pickups vs. miking the guitar.
 - Design/build/measure properties of preamp for piezo pickup.
 - Study/measure the frequency response of piezo pickup and its preamp.