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Investigation of Multi-frequency Raman Generated Spectra

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Since the advent of lasers, many different nonlinear optical techniques have led to shorter, higher-intensity pulses. At Waterloo, we are studying Multi-frequency Raman generation (MRG), which efficiently generates a large number of Raman orders spanning the spectral region from the infrared to the ultraviolet. The bandwidth of the Raman orders is sufficient to generate single-femtosecond duration pulses. While the pulse duration is longer than what is possible with high order harmonic generation, the conversion efficiency is much higher. While most research in this field is concerned with making as many Raman orders as possible, we noticed that the spectra of the individual Raman orders changed dramatically when changing either the dispersion in the nonlinear medium or the laser pump intensity. In this talk, I will discuss the possible physical process causing these changes in the spectra as well as how the changes effect the generation of ultrashort intense pulses.

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