Phys 564: Applied Optics

Project Topic: Photoconversion of Copper Flakes to Nanowires with Ultrashort Pulse Laser Irradiation

Abstract:
I will focus on the topics include in the paper entitled *Photoconversion of Copper Flakes to Nanowires with Ultrashort Pulse Laser Irradiation*. The authors assert that the size and shape of nanoscale materials allows for control over various physical and chemical properties. They posit that this control of these properties lends itself well to both metals and semiconductors. Shimotsuma *et al.* report the first experimental results supporting periodic nanostructures in silica after radiation by a Ti: sapphire laser. The data is interpreted as interference between the bulk electron plasma waves and the incident laser field providing periodic modulation of the plasma and structural changes to the transparent material. I intend to discuss the results presented by Shimotsuma *et al.* as well as some of the optics concepts needed to better comprehend the article.

Tentative Outline:

1. Motivation for study
2. Experimental Set up
3. Experimental parameters
4. Gaussian beam → waist diameter
5. Surface Plasmon Resonances
6. Brensstrahlung heating
7. TEM/SEM
8. Experimental Findings
9. Conclusion