

# A. J. Sabbah

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## Objective

A research and development position in the photonics industry.

## Education

Ph.D. Physics, Utah State University. 5/2002  
Dissertation title: **Ultrafast Carrier and Coherent Phonon Dynamics in Crystalline Silicon.**

B.S. Physics. 7/1987

## Profile

Extensive experience in:

- Working at ultrafast optics laboratories (10 years).
- Pump probe experiments to study ultrafast electron dynamics in semiconductors and wide bandgap materials (6 years).
- Laser ablation of solid materials and micromachining (4 years).
- Ultra-high vacuum (2 years).
- Spectral interferometry (2 years).
- Teaching introductory physics (6 years).
- Ultra Long Surface Plasmon (ULSP) range measurements (12 months).

Enjoy working in a team environment. Possesses excellent verbal and written communication skills.

## Professional Experience

### **Colorado School of Mines/ Physics Department** **2/2004 - present**

- Developed spectral interferometry imaging technique to measure the depth of micro-machined features with 50 nm resolution.
- Optimized the laser induced forward transfer technique (LIFT) to imprint sub-micron metal features on glass substrate.
- Built Ti:sapphire regenerative amplifier.
- Explored the characteristics of ultra long range surface plasmon in asymmetric structure for plasmonic devices application.

### **The University of New Mexico/ Physics Department** **10/2002 - 2/2004**

- Measured the damage fluence as function of pulse duration of oxide and fluoride wide bandgap materials in the (25fs-1.3ps) time regime.
- Measured the dielectric functions of highly excited wide bandgap materials as function of delay time with femtosecond resolution.

### **Utah State University/ Physics Department** **1992- 10/2002**

- Measured electron-phonon relaxation time, coherent phonon frequency, surface recombination velocity, and electron scattering time in crystalline silicon.
- Built ultrafast spectroscopy laboratory from scratch, that include: a Ti:sapphire oscillator, a rotating mirror autocorrelator, a grating spectrometer, an ultrahigh vacuum system, and vacuum compatible sample holders.

- Contributed in designing and building a vacuum system to measure the resistivity of insulator thin film for space application.

### Skills and Expertise

- Femtosecond laser ablation and micromachining of solid materials.
- Pump-probe technique for probing the dynamics of electrons, holes, and phonons in solid materials.
- Laser induced forward transfer (LIFT) of metals.
- Ellipsometry for optical constants measurement.
- Building metal thin films by evaporation technique in vacuum system.
- Designing and building Ti:sapphire femtosecond laser oscillator-amplifier system.
- Designing and machining of mechanical devices and apparatuses for scientific experiments.
- Mathematical modeling and fitting of experimental data using IGOR Pro software.
- Planning, designing, and execution of laser spectroscopy experiments involving laser solid interaction.
- Excellent writing of experiment records and data organization.
- Writing experimental results in scientific journals and presenting it in international conferences.

### Laser system experience

- Ti:sapphire oscillator with short cavity (80 MHz), and extended cavity with telescope and acousto-optic modulator (20 MHz).
- Ti:sapphire amplifier with multipass and regenerative design.
- Double frequency Nd:YAG laser.
- HeNe for alignments and experimental applications.

### Computer proficiency

- Professional user of Origin Pro, IGOR Pro, and MathCad.
- Experience with WinLase for laser cavity design.
- Familiar with most productivity software running under MS Windows.
- Professional user of Wvase for spectroscopic data analysis.

### References

Prof. Thomas Furtak  
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