

Tuesday 08<sup>th</sup> June 2010, 11:30 am

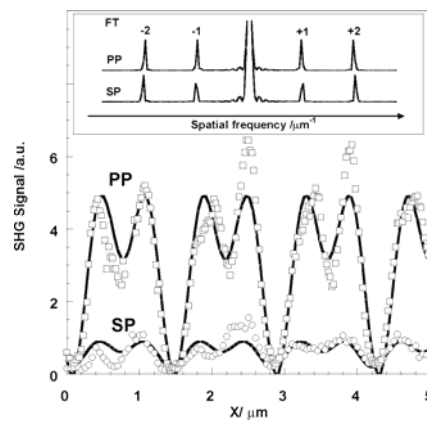
IFR conference room

### Probing Molecular Orientation in Anisotropic Materials and Surfaces.

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Molecular orientation in bulk materials or surfaces is of great importance since it often affects the mechanical, optical, electrical macroscopic properties of the material or the reactivity of the surface. A precise knowledge of such orientation at a molecular level can be measured by optical techniques in the linear and nonlinear regimes. Polarized Raman Microscopy can be used to measure the first two even order parameters,  $P_2$  and  $P_4$  while second order nonlinear optical techniques can access the first two odd order parameters,  $P_1$  and  $P_3$ . These parameters can then be used to build a distribution function that accounts for the molecular orientation. In this seminar, we will present results conducted of a nonlinear optical device that generates and diffracts 2<sup>nd</sup> harmonic light from a 1.06  $\mu\text{m}$  laser. We will explain how we fabricate this nonlinear optical grating and show how we have characterized the molecular orientation of the nonlinear-optical-active molecules using a combination of confocal microscopy (for Raman measurements) and near-field scanning optical microscope (for second harmonic generation measurements).



*Polarized SHG signal from a NLO surface grating collected with a near field optical microscope. Inset: Fourier transform of the space domain to the frequency domain showing the first and second diffraction orders.*