

TUESDAY, APR. 3, 2001
RM 113 MacNAUGHTON BLDG.
UNIVERSITY OF GUELPH
4:00 p.m.

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Direct Measurement of Atom Diffusion Using Atom-Tracking STM

In order to gain a fundamental understanding of the details of atom processes on surfaces, we use a technique called "atom tracking" to quantitatively measure the diffusion kinetics of adsorbed atoms on crystal surfaces. In atom-tracking mode the STM probe tip is locked onto a selected adsorbate using lateral feedback. Once locked, the feedback electronics maintain the tip over the atom as it diffuses over the substrate tracking its coordinates. Because the instrument spends all of its time measuring the kinetics of the diffusing atoms, the time resolution is improved by more than 1000 over conventional STM imaging techniques. By measuring the diffusion statistics of the adsorbates as they meander near surface steps and defects we can extract subtle binding energy differences from lattice site to lattice site due to the adsorbate-defect interactions. By increasing the capability of the STM to yield quantitative measurements that were previously inaccessible, we provide additional insight into the complicated interplay between processes at work during growth and etching.

COFFEE WILL BE AVAILABLE PRIOR TO THE COLLOQUIUM