

FLEXIBILITY AND UTILITY OF PRE-PROCESSING METHODS IN CONVERTING STXM SETUPS FOR PTYCHOGRAPHY

CATHERINE A. FROMM

1. GENERAL ABSTRACT

As our technology gets smaller and smaller, it is more important than ever to be able to look at things on a very small scale. Scientists are always limited by the optical properties of systems, but new techniques are being developed to go beyond traditional microscopy and see even deeper into the fabric of our world. Ptychography, an exciting new microscopy technique, uses bright x-ray light from synchrotron sources in combination with sophisticated computer reconstruction. In this technique, a tiny sample is scanned through a beam of x-rays, and the way it scatters the light is measured with a camera. The scatter pattern is collected at many different points on the sample. In the reconstruction phase, a computer uses an iterative algorithm to match the scattering information to the physical shape of the sample that scattered the x-rays. This reconstruction leads to a well resolved image of the sample. These images allow scientists to see things as small as five nanometers big, about the size of a single protein. The ability to probe these tiny systems allows scientists a unique look into molecular processes and structures previously unexamined.

SLAC National Accelerator Laboratory, 2575 Sand Hill Road, Menlo Park, CA 94025

This material is based upon work supported by the U.S. Department of Energy, Office of Science, Office of Workforce Development for Teachers and Scientists (WDTS) under the Science Undergraduate Laboratory Internship (SULI) program, under Contract No. DE-AC02-76SF00515.