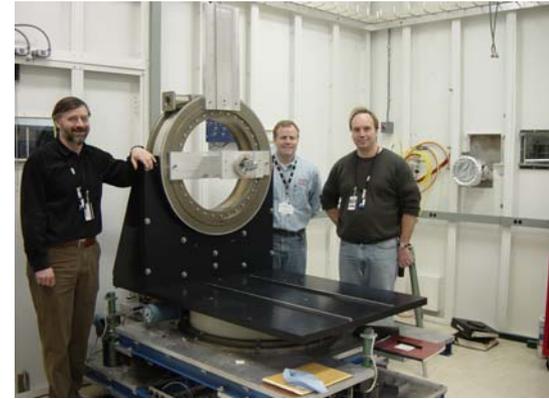


# MRI: Development of a Surface Scattering System for Real-Time X-ray Studies of Growth and Processing

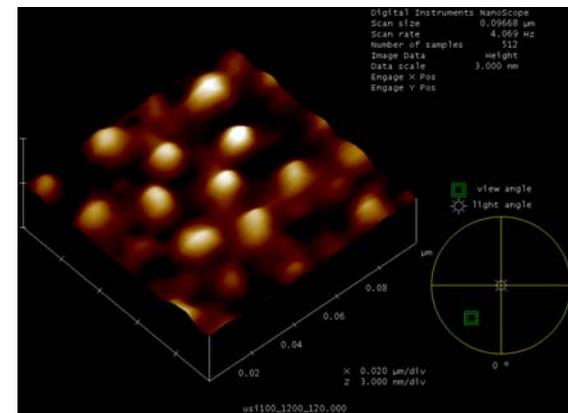
*Karl Ludwig and Theodore Moustakas Boston University*

*DMR-0116567*

We have built a specialized system that will allow us to use intense x-rays from the National Synchrotron Light Source (NSLS) to study how the atoms in materials arrange themselves during “processing”. Such processing can include, for instance, bombardment by an ion beam or thin film growth by atomic beams. These are technologically important processes into which x-ray scattering will give us fundamental atomic-level insight. Ultimately, this system provides the necessary infrastructure for a wide range of materials research programs that will include collaborations between scientists at Boston University (BU), the University of Vermont (UVM), and the Naval Research Laboratory (NRL).



*Above: Ludwig (BU), Eddy (NRL) and Headrick (UVM) with the base diffractometer installed at the NSLS. Below: Atomic Force Microscope image of a silicon surface after bombardment by ions. A local order of hills created by the ion bombardment is seen.*



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## **Education and Outreach:**

Four graduate students (Ahmet Özcan, Justin Hotchkiss, Gözde Ozaydin, Yiyi Wang and Rajwinder Singh) and an undergraduate (Marta Szpilowska) have contributed to this project. In addition, the assembly and testing of the equipment is providing an excellent opportunity for students to learn about important materials technologies and is giving them the opportunity to interact with scientists beyond their home academic institution.

During Summer 2002, we used the project to introduce two students in the Boston University High School Honors Summer Research Internship Program (Scott Schwitz and Erica Chan) to materials research.



*Above: Clockwise from bottom left, Szpilowska, Ozaydin and Ozcan with the processing chamber. Below: Ludwig with Chan and Schwitz.*

