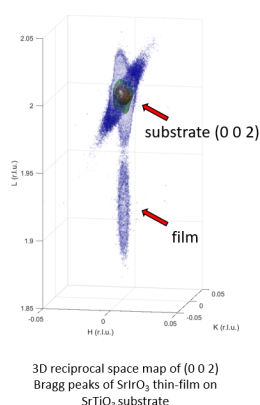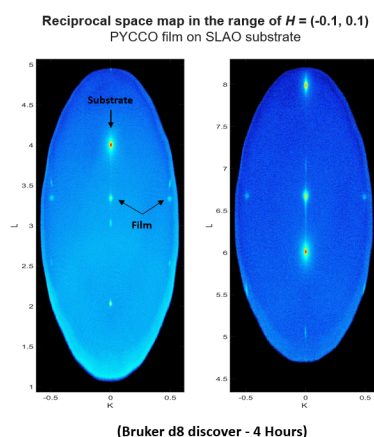# Fast 3-dimensional reciprocal space imaging with laboratory X-ray diffraction: RSLab

A software that adds fast 3D reciprocal space imaging capabilities to laboratory X-ray diffractometers with 2D detectors.

Technology ID
2021-290

Category
Engineering & Physical Sciences/Instrumentation, Sensors & Controls
Life Sciences/Research Tools
Software & IT/End User Software
Software & IT/Image & Signal Processing
Software & IT/Open Source

View online

3D reciprocal space map construction

3D reciprocal space map of (0 0 2) Bragg peaks of $SrIrO_3$ thin-film on $SrTiO_3$ substrate

Fast reciprocal space mapping

Reciprocal space map in the range of $H = (-0.1, 0.1)$
PYCCO film on SLAO substrate

(Bruker d8 discover - 4 Hours)

IP Status: Copyrighted

Applications

- Software for X-ray diffractometers

Overview

Researchers at the University of Minnesota have developed an innovative X-ray diffraction software that adds new analytical capabilities to commercial laboratory X-ray diffractometers equipped with 2-dimensional detectors. The software significantly enhances capabilities of compatible laboratory X-ray instruments, enabling research usually requiring access to synchrotron facilities. This software introduces the following new functions:

- Construct detailed 3-dimensional reciprocal space maps from multiple detector images,
- Perform wide reciprocal space mapping magnitudes faster than using traditional measurements
- Computationally emulates traditional measurements after experiments.

The software is designed to work for a variety of instruments from different vendors, such as Bruker and Rigaku (instrument configurations and data may be needed to add support to users' instruments).

Key Features of RSLabTM

- Drastically improves capabilities and efficiencies of laboratory X-ray diffractometers via software without requiring any changes to the hardware
- Simplify experiment procedures
- 1D, 2D and 3D data analysis seamlessly integrated into a graphical user interface (GUI) program that run on laptop and desktop PC
- Automatic and semi-automatic data analyses
- Explore data and emulate scans after experiments

Software Specifications and System Requirements

Language: .p code (MATLAB code) or .exe windows executable. Matlab or Matlab runtime (MCR) is required to run RSLab.
Hardware: Software configuration needs to be compatible with Hardware. Please reach out to yug@umn.edu for technical questions on this.

Phase of Development

TRL: 7-8 Software will be available for download. Please inquire with Dr. Guichuan Yu (yug@umn.edu) for instrument compatibility and customization before download.

How to Download?

This technology is now available for licensing. Interested non-profit organizations may download and use the software free of charge by executing the license agreement provided on the right panel. Please contact us for commercial needs.

Researchers

- **Guichuan Yu, PhD** Staff scientist, Characterization Facility; Imaging analyst and consultant, Minnesota Supercomputing Institute
- **Javier Garcia Barriocanal, PhD** X-Ray Scattering (XRS) Specialist, Characterization Facility

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