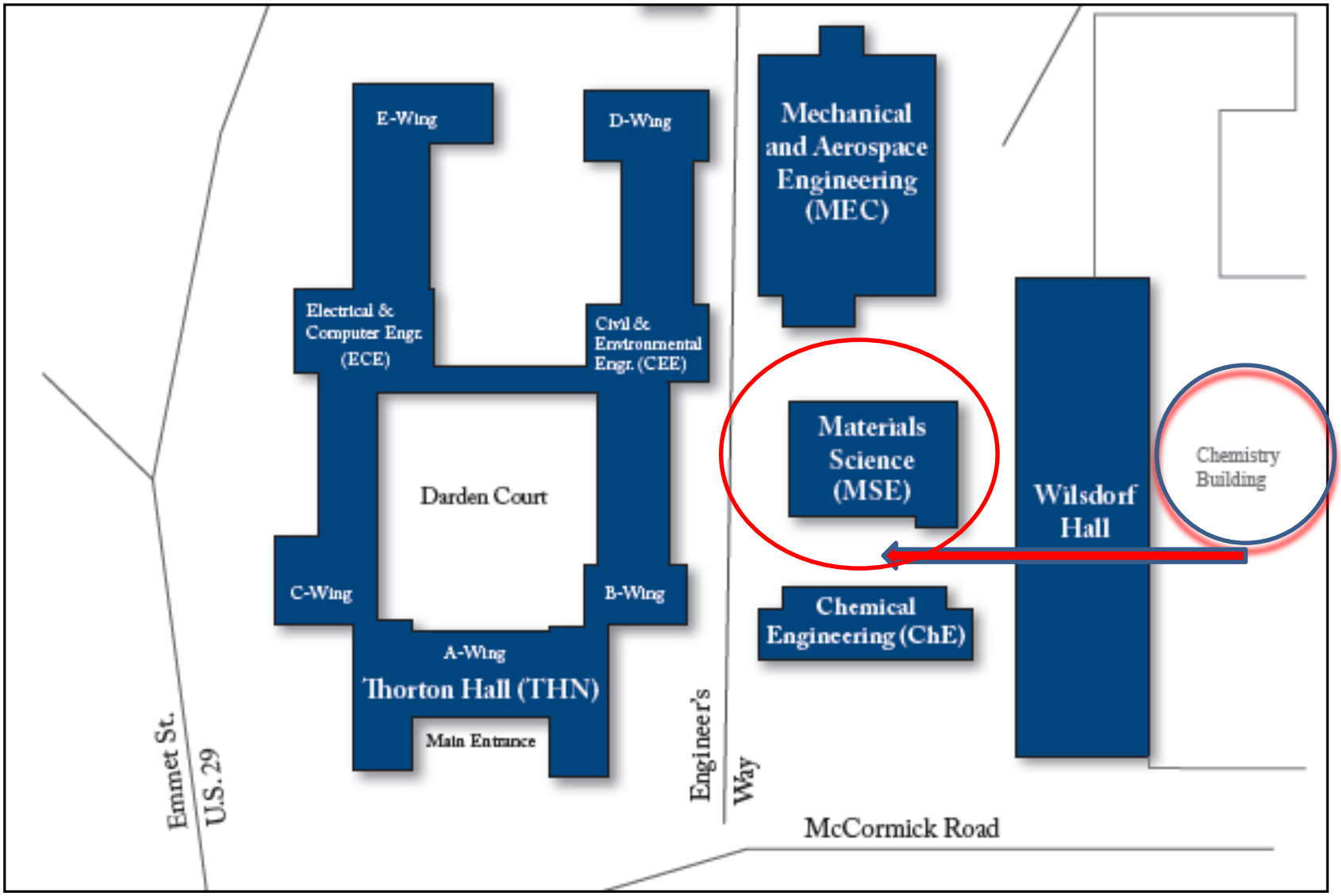
X-Ray Instrumentation

Nanoscale Materials Characterization Facilility (NMCF), Department of Materials Science and Engineering, University of Virginia



The NMCF location

Bruker Kappa Duo CCD Single-Crystal Diffractometer

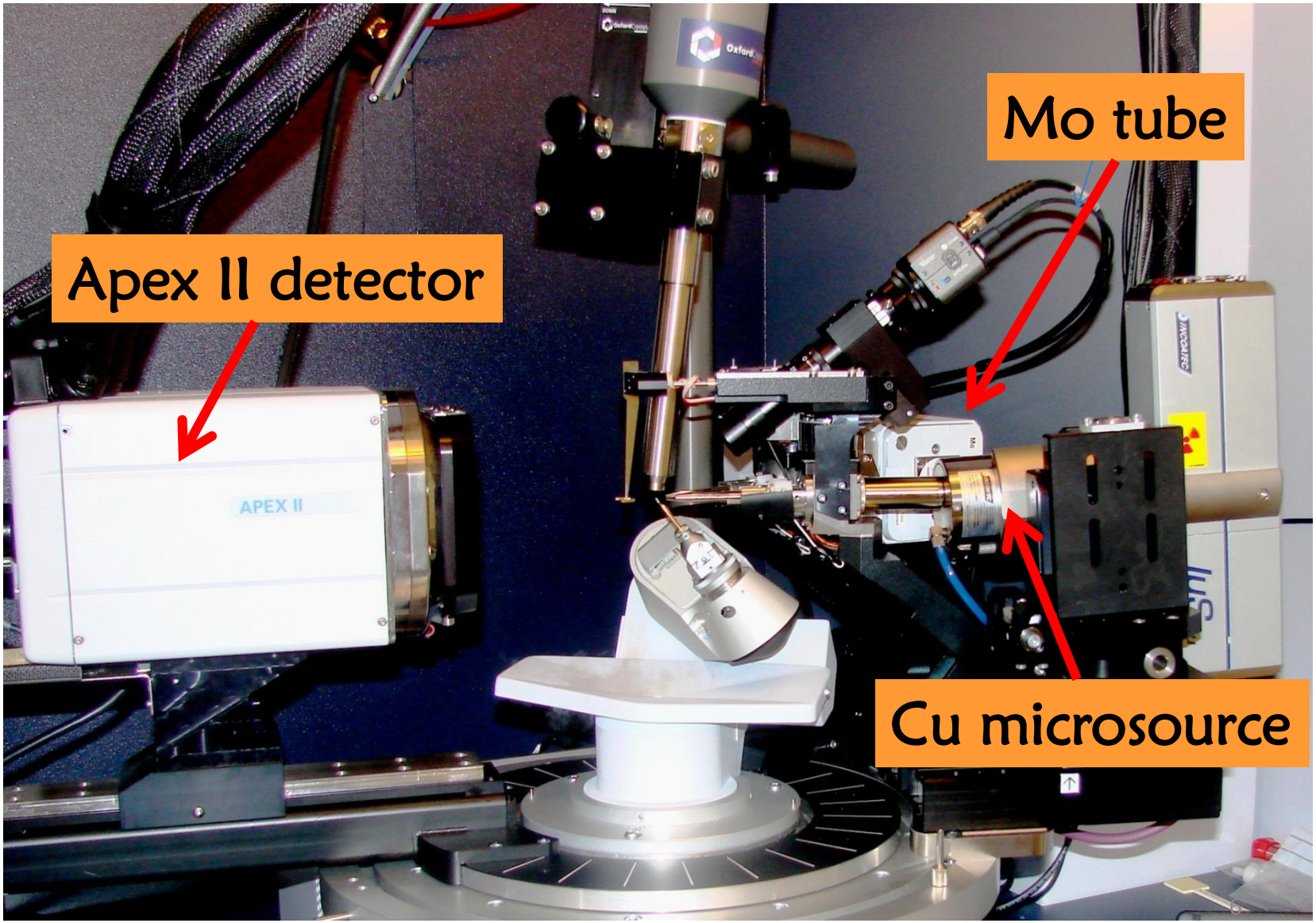
Location:

Nanoscale Materials Characterization Facility (NMCF), Department of Materials Science and Engineering, Room 100

Bruker Kappa Duo CCD Single-Crystal Diffractometer

The Bruker Kappa Duo diffractometer combines molybdenum and copper X-ray sources with a highly accurate goniometer and one of the most sensitive CCD detectors (Apex II) for X-ray crystallography. The result is a highly versatile instrument that allows fast and redundant data collection to high resolution. The research groups of Professors Harman, Gunnoe, Fraser, Pu, Demas and others in the Chemistry Department use the diffractometer for high-quality X-ray structure determination of their compounds. The group of Professor Mura applies the instrument in their research on protein structure.

Kappa Duo Goniometer



Panalytical X'Pert Pro MPD Powder Diffractometer

Location:

Nanoscale Materials Characterization Facility (NMCF), Department of Materials Science and Engineering, Room 102

Panalytical X'Pert Pro MPD Powder Diffractometer

Applications:

-Qualitative and quantitative phase analysis of polycrystalline materials

-Crystal structure determination from powder diffraction data

-Characterization of thin films and surfaces by X-ray reflectivity and grazing incidence methods

-Texture and stress measurements

Rigaku S-MAX 3000 Small-Angle X-Ray Scattering (SAXS) Instrument

Location:

Nanoscale Materials Characterization Facility (NMCF), Department of Materials Science and Engineering, Room 114

Rigaku S-MAX 3000 Small-Angle X-Ray Scattering (SAXS) Instrument

SAXS patterns are collected at very small scattering angles (in the range of 0.5-6°). Usually, SAXS is used to determine the structure of particle systems in terms of average particle sizes and shapes. The materials can be solid or liquid and they can contain solid, liquid or gaseous domains (so-called particles) of the same or another material in combination.

The method is accurate, non-destructive and usually requires only a minimum of sample preparation.

Applications are very broad and include colloids, metals, ceramics, polymers, plastics, proteins and other biological macromolecules in solution.

The grazing-incidence SAXS (GI SAXS) is used in our facility to study thin films and surfaces.

Xradia MicroXCT 200 X-Ray Computed Tomography (XCT) Instrument

Location:

Wilsdorf Hall,
Room B011

Xradia MicroXCT 200 X-Ray Computed Tomography (XCT) Instrument

X-ray Computed Tomography (XCT) is a nondestructive technique for visualizing interior features within solid objects, and for obtaining digital information about their three-dimensional structures and properties.

The XCT imaging is created by directing polychromatic X-rays at an object from multiple orientations and measuring the decrease in intensity caused by absorption of X-rays. XCT is an excellent technique for studying the defects such fractures and cracks in a variety of materials.