SAXS/WAXS laboratory instrument dedicated to nanomaterials
An X-ray scattering study of 4.8 wt% PEGylated duroplasticized starch in a wide range of temperature is described. The different parts of the instrument are described in detail, along with several calibration and example from recent research.

Temperature effects
T. W. Thyn and C. J. G. Besen
Molecular conformation sampled by infrared temperatures, which can have appreciable impacts on crystal structure and rheological properties. Ability to model such expansion using high level electronic structure methods is explored in the context of understanding the expansion effects in alaninate several crystal structures.

Revolutionizing ultra-high precision x-ray Diffraction Gratings
IUCr Instrumentation and methods

SPECIFICATIONS
- Up to 130,000 resolving power measured at 100° 2θ
- Blaze angles down to 0.4 degrees
- Line density 300-2500 lines/mm
- Up to 25mm long, 56mm wide, planar and lightly spherical substrates
- Coatings – Au on silicon or fused silica substrates

Inprentus provides custom mechanically ruled, high-efficiency variable line spacing diffraction gratings for EDX and soft X-ray applications. Inprentus uses nano-scale dual atomic microscope scribbling methods, producing gratings that far exceed the specifications of other grating technologies.
Instrumentation and tool making are fundamentally important for scientific progress, enabling exploration at the frontiers of the microscopic and macro-world. As Gaifman’s telescope opened up the Centre, Deleuze’s concept of microscopism, both for those required the microscope, subsequent interpretation by Descartes, Leibniz and Huygens rolled on new instrumentation to revolutionize structural sciences, the IVC and its various journals published significant weight and major developments ranging from tiny ingrown hair to extracellular filaments, synchrotron and free-electron lasers. - James Hopkins

**Automatic**

- **Auto-EM (1)**: D72 to D92, 955–975
- **Auto-Cryoelectron microscopy (2)**: A. Kupers et al., 118–135

**RoboDiff**, combining a sample changer and pipetman for highly automated macromolecular cryocrystallography experiments

D. Hansma et al., 117–135

- **Auto-Synchrotron (3)**: D76, 416–420

Automated freezing and processing of protein crystals through laser photoinitiation

E. Driebe et al., 117–135

**Synchrontron beammains**

- **Spring-8 (1)**: A. Gaffney, 138–142
- **Dawn-synchrotron (2)**: N. Li, Y. Y. Wu, C. L. Chen, P. Hao, H. Wu, H. Tang, F. E. Tang and Y. Zheng

The new NCPSL BL129 beammain at the SRSF for small-angle X-ray scattering from biological samples in solution

- **Blumberg (3)**: A. Schwabe, 138–142

The SPECIES beamline at the MAX IV Laboratory for soft X-ray REX and APXS

- **Stephens (4)**: A. Gaffney, 138–142

- **Hatsu et al.** (5), the soft X-beamline for the bioreactors consisting and ambient pressure synchrotron in the new MRS is described

**Compton scattering**

- **Auto-Compton (1)**: D71, 102–107

On the possibility of using X-ray Compton to study magnetoplasmonic oscillators

S. P. Collins et al., 102–107

**Cryo-EM**

- **Auto-D71**: 1, 157–168

Cryo-electron microscopy and X-ray crystallography: complementary approaches to structural biology and drug discovery

C. Essenfelder, T. F. W. Forster and J. R. Smith

- **Auto-D71**: 1, 169–179

Open access sponsored by The Thermo Fisher Sceintific Foundation

**Detectors**

- **Auto-D71**: 1, 179–189

ERGIE: detector application in macromolecular cryo-electron microscopy

X. Cai et al.

**Electron microscopy**

- **Auto-D71**: 1, 190–200

Transmission electron microscopy for the evaluation and optimization of crystal growth

H. J. Hurley et al.

- **Auto-D71**: 1, 201–209

The potential use of single-particle electron microscopy as a tool for structure-based inhibiting design

S. Barber, J. M. MacKinnon, E. M. Johnson, C. R. Coles and P. M. Aach

**Neutron instruments**

- **Auto-D71**: 1, 210–220

The new neutron grating interferometer at the ANKA/RAKIM beamline design, principles and applications

T. Frenkel, A. Middendorf, K. Heidenreich, B. Zeyen, P. von Bode and Z. Schick

- **Auto-D71**: 1, 221–232

SHEG: a new time-of-flight single-crystal neutron diffractometer at J-PARC

**VAM**

- **Auto-D71**: 1, 233–238

**In-cell NMR**: a topical review

E. Lichter and J. Bax

**Optics**

- **Auto-D71**: 1, 239–246

Diamond-shape crystals for X-ray optics applications

T. Kikugawa, P. Thibault, S. Tsentos, Y. Enokida and T. Shitada

**Programs**

- **Auto-D71**: 1, 247–256

FID20: a multi-purpose data reduction, analysis and visualization program

A. Frazier, D. F. Scott and B. W. Pasel

**SHARP**

- **Auto-D71**: 1, 257–263

S. Marchett, D. Knobler, B. Damer, D. Shapira, T. Necli, J. Arisho and R. C. Mills

**Real-time imaging**

- **Auto-D71**: 1, 264–272

Real-time image-construction-based beamline control for smart 4D X-ray imaging


**Radiation damage**

- **Auto-D71**: 1, 273–279

RNA protects a nucleic acid complex against radiation damage


**Candes**

- **Auto-D71**: 1, 280–288

Candes: computer-aided directed evolution of enzymes


**CADS1**

- **Auto-D71**: 1, 289–296

CADS1: computer-aided directed evolution of enzymes


**DNA**

- **Auto-D71**: 1, 297–305

DNA: a biological role? Nine molecular mechanisms of evolution, was developed at the Materials and Biology Division of the Department of Energy Office of Basic Energy Sciences, Lawrence Berkeley Laboratory and epoxy silicon dioxide analysis in a high-performance liquid chromatograph is performed to evaluate its performance.