

LIFE SCIENCE

Two undulator beamlines – BL41XU and BL45XU –, and two bending-magnet beamlines – BL40B2 and BL44B2 – are now fully operational and dedicated to structural studies in the field of life sciences. Charge-coupled device (CCD) detectors have been introduced at BL41XU and BL44B2. Such high efficiency detectors could partly relieve the congestion of these beamlines. Similar detectors will also be installed in other beamlines. These beamline improvements parallel the growing demand for synchrotron radiation usage in this field. A variety of new proteins, supramolecular complexes and fibrous specimens, as well as some proteins from structural genomics projects are being analyzed at these beamlines.

*Accurate aminoacylation is a crucial step for accurate translation of the genetic code. Atomic-resolution structural analyses of two aminoacyl-tRNA synthetases, IleRS and ValRS, have addressed this editing mechanism in considerable detail. The structure of a DNA replication initiator protein bound to a replication origin sequence has been determined using the undulator beamline BL41XU. This structure sheds light upon the mechanism of DNA replication initiation triggered by initiator-protein binding. The oxygen sensor domain of FixL from *Rhizobium meliloti* has been analyzed at 1.4 Å resolution using the data collected at beamline BL44B2. The structure was solved by MAD using an anomalous signal from Fe.*

Some beamlines are dedicated to medical use. The medium-length bending-magnet beamline BL20B2, mainly designed for medical applications, has been operational and available to users since October 1999. Micro-angiography can be used for visualization of tumor-induced small blood vessels. In addition, real-time phase-contrast X-ray imaging has been performed at the contract beamline BL24XU. Such experiments have demonstrated the diagnostic power of X-ray imaging.

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