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Updates on the computed tomography experiment at the Medical and Imaging beamline of the Australian Synchrotron

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The Imaging and Medical Beamline (IMBL) of the Australian Synchrotron (AS) is now becoming one of the most advanced instruments of this type in the world. It is designed to provide a wide variety of imaging techniques including but not limited to the in-line and analyzed phase contrasts, monochromatic and pink beam imaging. Three beamline's enclosures at various distances, when combined with the 25kW superconducting multipole wiggler and double Laue bent monochromator provide the end user a good choice of beam characteristics ranging from the hi-flux for high resolution and size up to huge 48x5cm beam at 134m from the source with the allowed energy range 17-120kEv or pink beam. The wide range of the area detectors allows the computed tomography (CT) to be applied to almost any known X-ray imaging modality. The beamline's data acquisition system is directly linked to the high performance computing cluster. Deep integration of the acquisition, reconstruction and rendering facilities allows one to think of their combination as of a single system with modular architecture. The system is designed for the fully automated experiments with minimal user interaction. It has multiple levels of flexibility allowing quick design and implementation of a new experiment. This report summarizes implemented, designed and planned features of the beamline as applied to the imaging experiments. Some latest outcomes of the CT system are presented with the samples coming of different fields of science: Biology, Geology, Paleontology and Medicine.

Keywords

computed tomography, imaging, medecine, biology, visualization, big data

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