Next Generation Endstation for Concurrent Measurements of Charged Products and Photons in LCLS FEL Experiments

2012 J. Phys.: Conf. Ser. 388 142025

(http://iopscience.iop.org/1742-6596/388/14/142025)

Journal of Physics: Conference Series **388** (2012) 142025 doi:10.1088/1742-6596/388/14/142025

LAMP – LCLS-ASG-Michigan Project
Next Generation Endstation for Concurrent Measurements of Charged Products and Photons in LCLS FEL Experiments.

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Synopsis We are designing and building the next generation multi-purpose instrumentation especially adapted to accommodate unique large-area, single-photon counting pnCCD detectors together with advanced many-particle ion and electron imaging spectrometers (reaction microscope, REMI; velocity map imaging, VMI; magnetic bottle) for simultaneous detection of scattered and fluorescent photons and charged particles in experiments at the LCLS FEL.

LCLS-**A**SG-**M**ichigan **P**roject (LAMP) is a multi-institutional collaborative effort to design and build the next generation end-station for the LCLS AMO beamline.

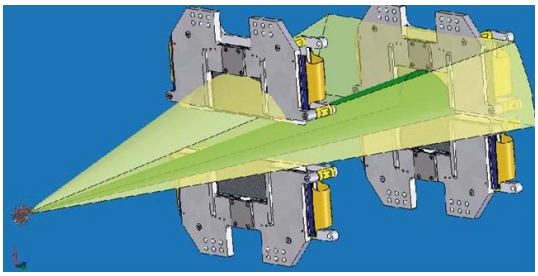

Figure 1. Arrangement of the front and back pnCCD detectors and their acceptance angles.

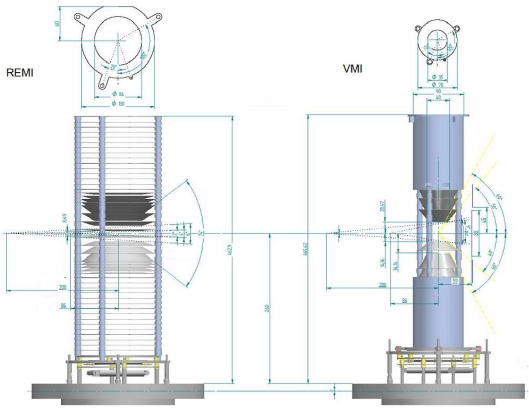

Figure 2. REMI and VMI spectrometers with a large unobstructed view for the photon detection.

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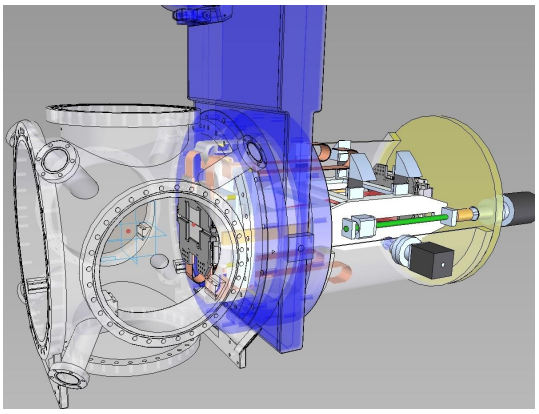

Figure 3. Schematics for the new Reaction-Chamber – Detector-Chamber interface

Equipped with two large-area (78 x 74 mm^2), single-photon counting 1 Megapixel pnCCD detectors (75 x 75 μm^2 pixel size) (see fig. 1) and REMI, VMI (see fig. 2), or a custom build spectrometer provided by the user, the new end-station is based on the existing CAMP [1] instrument but will present improvements such as extended range and flexibility of detector positioning and control (see fig. 3), better vacuum level, more convenient sample changing procedure, better temperature control, more versatility with pump-probe laser in- and out-coupling, etc. The instrument will be available to any scientist and is planned to be commissioned in the second half of 2012.

This work is funded by the DoE, Sc, BES, LCLS and Max Planck Society.

References

[1] L. Strüder *at al* 2010 *Nucl. Instr. Meth. A* **614**, 483