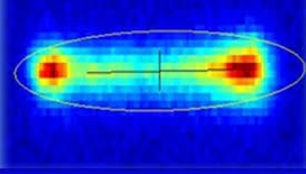


Accelerator and Detector Research and Development Program Principal Investigators' Meeting

August 22-23, 2011
The Westin, Annapolis, MD



The Accelerators and Detector Research and Development Program Principal Investigators' meeting held on August 22-23 2011 in Annapolis (MD) was a very interesting experience and I believe that such interdisciplinary meetings must be encouraged and further supported, in particular if selected light source users are present.

The scientific communities need to acquire a common background and language, in particular when dealing with light sources and the relevant experiments. In these last decades we have diverged too much with very marginal overlaps between accelerators and detectors physicists and users. Today to design a common strategy and a common vision is extremely important for we are facing very difficult times. We really need to do our best to keep going with high-profile scientific programs by increasing our effectiveness and efficiency in performing leading-edge science that must be focused on the needs of our present day life.

Concerning the development of new radiation source facilities I believe we need, more and more, expertise bridging machine and users science. Such professional figures are very scarce but they must be scouted for and promoted through these interdisciplinary meetings. After all, there is a lot to gain by overlapping different skills and expertise.

Starting from the excellent presentations given at the meeting I was really impressed about the quality of the research done and the present and future projects.

The free electron sources are now well established for operating in the SASE mode and in the hard X-ray regime. However, the need of high repetition rate fully coherent seeded FELs must be the next milestone on the road map for the future light sources. This will require a strong R&D program on high repetition rate electrons injectors, advanced concept for cold and warm LINAC, effective and reliable seeding technology, high performance laser sources, synchronization technology and front edge diagnostic. Most of these arguments have been successfully presented and discussed proving that in USA exists a solid and available know-how.

Nonetheless, some new programs and projects should be, in my opinion, considered for the near future. The most urgent is the need of a significant advancement on the science and R&D of ultrafast X-ray optical components, photon beam transport and diagnostic. Also the areas of detectors, data storage and manipulation should also be considered.

In a more general vision it is quite clearly emerging also the necessity of programs mostly focused on radiation sources that could be used as test facility, such as the BELLA program at LBNL. Test facilities are essential tool for studying the FEL physics, innovative idea and models. Moreover, such facilities are of paramount importance as test-bed for future and advanced FELs facilities. Much can be anticipated in terms of FEL physics and R&D with such a facility. Several programs and new ideas have been reported at the meeting about this argument.

At the horizon we start to see the “ultimate storage rings”. Petra III at DESY, MAX IV in Sweden, PEP X at SLAC and other resulting from the upgrade of already operating high energy storage rings. The leading photon parameters for such sources are the horizontal emittance, close to the theoretical limit and the brightness (peak, average and spectral). Once these sources will be operating an important step further will be accomplish in particular concerning the elastic scattering and coherent imaging experiments. However, much less has been done for the soft- x-ray sources. Here a strong intellectual effort must be done in order to identify the leading parameters for such ultimate storage rings.

I wish to conclude this summary-overview of the meeting saying that there is a crucial necessity for an intellectual effort in terms of defining in more details a coherent road map between the science programs and the photon source parameters. My overall impression is that soon we will have fully coherent ultrafast X-ray photon sources. Do we have scientific programs that will take full advantage for such X-ray photon properties?

Fulvio Parmigiani

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