
Subject: Usage of a campus wide frequency and time standard
Posted by [Walter F.J. Müller](#) on Sat, 04 Dec 2004 21:40:05 GMT
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The Accelerator Division is currently working on the technical concept of the next generation timing system. This activity was originally prompted by the requirement of the PHELIX experiment to synchronize a laser shot with the arriving pulse to a precision of 100 ps, thus the internal name "BuTiS" for 'Bunchphase Timing System'. This scope has of course widened, the objective is now to provide the timing reference for all FAIR accelerator components, and if there is interest, also the experiments.

The current specs call for a long term stability of 100 ps across the whole GSI site, and a timing jitter of well below 100 ps. The system will provide a campus reference for standard frequencies (current plan is 200 MHz and 10 MHz) and standard time (UTC) which will be derived from a GPS based reference. In addition, auxiliary information channels are foreseen which will provide for example triggers for specific accelerator events.

Getting this performance over distances of up to 1 km has a price, the technologies and components used in BuTiS seem to be too expensive to be used in a local time distribution system of an experiment, where 100-1000 end nodes have to be served over quite short distances.

However, it seems prudent to use BuTiS as master clock/time reference for the local time distribution systems of experiments. This would also allow a more modular approach, using a local time distribution system per detector sub-system. This is of particular interest for experiments where parts of the setup are in different locations, like in many SuperFRS experiments.

Bottom line is: The impact of the availability of a campus-wide frequency and time standard on the design of the experiment time distribution systems has to be evaluated. On the other hand, the BuTiS design team, contact is P. Moritz, is very interested to have a closer contact to the physics research groups.