Contribution ID: **199** Type: **Oral presentation**

Invited Talk: Mastering Picosecond Precision: Lessons learned from Large-Scale Timing Systems

Thursday 25 April 2024 16:20 (40 minutes)

The MEG II experiment, based at PSI in Switzerland, aims to detect rare muon decay events. A critical aspect of this experiment is the precise measurement of the timing of both the calorimeter and timing counters, achieving accuracy within a few picoseconds. This precision is made possible by employing the DRS4 Switched Capacitor Array ASIC alongside a sophisticated timing system. This system integrates a custom crate standard to ensure synchronization across more than 30 crates, encompassing over 9000 channels.

The presentation will focus on the practical insights gained from designing and operating such an extensive system over several years. Key areas of discussion will include strategies for clock generation and distribution, methods for jitter reduction, the impact of noise, and techniques for global time calibration. The experiences and lessons learned from this endeavor will be shared in a manner that is highly relevant and transferable to other experiments striving to achieve optimal timing precision.

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Presenter: RITT, Stefan (Paul Scherrer Institute)

Session Classification: Oral Presentations