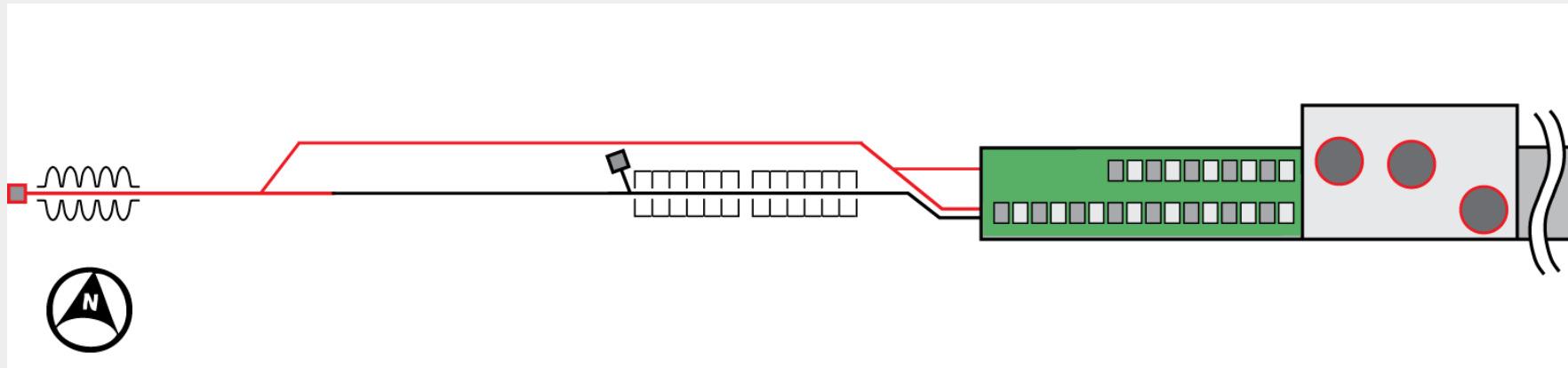


Timing System Challenges for the New LCLS-II SC

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SLAC



- 4 GeV, 1 MHz, CW addition to the LCLS facility
- Install a SC linac in the first 1/3rd of the linac
- Leave the middle 1/3rd for FACET and future expansion of the SC linac
- Combined operation with the LCLS-I at 120 Hz

- Present LCLS-I timing for 120 Hz bunches
 - 360 Hz triggers synchronized to AC power line
 - 119 MHz RF clock synchronized to the LLRF
- LCLS-II will have 1 MHz bunch frequency
 - Interleaved delivery of bunches to two undulator beam lines with arbitrary patterns
 - E.g. 2x500kHz, or 100kHz+900kHz etc.
 - Single pulses and 1 MHz bursts.
 - Additional flexible patterns for diagnostic pulse stealing in the linac
- Single timing system for both machines

- What is the maximum event rate compared to present 360 Hz?
- Is 1 MHz event pattern feasible?
- If not 1 MHz, how about a lower pattern rate combined with “unadorned” triggers at 1 MHz
- Where are the bottlenecks for data acquisition at 1 MHz?
 - LCLS-I does Beam Synchronous Acquisition at 120 Hz

- Compensation of fiber drift with loopback between receivers and generator
- White Rabbit aims for 1 ns over 10 km links
- Javier Serrano

