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## **Analog APS linac phase detector and digital phase detector test comparison**

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Maintaining beam-accelerating structure RF phasing of a linac is crucial for maintaining optimal beam transport performance. At the Advanced Photon Source (APS), in 2008 we implemented an analog phase detector system using the Analog Devices AD8302 phase detector chip. The APS phase detectors use as an S-Band RF phase reference an out-coupled signal from the waveguide supplying the accelerating structures with RF and an S-Band filtered RF signal from a bpm for the beam-RF system phase measurement. The phase detectors are used throughout the length of the linac in a control law to automatically maintain the beam on-crest phase condition during operations. We have obtained from Instrumentation Technologies two phase detection systems we evaluated as a possible upgrade path for the legacy APS phase detector system. The systems are the Libera LLRF and Libera cavity BPM products available from Instrumentation Technologies. We compare the performance of each system to induced phase changes using the APS Linac RF thermionic gun electron source.

### **Footnotes**

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