

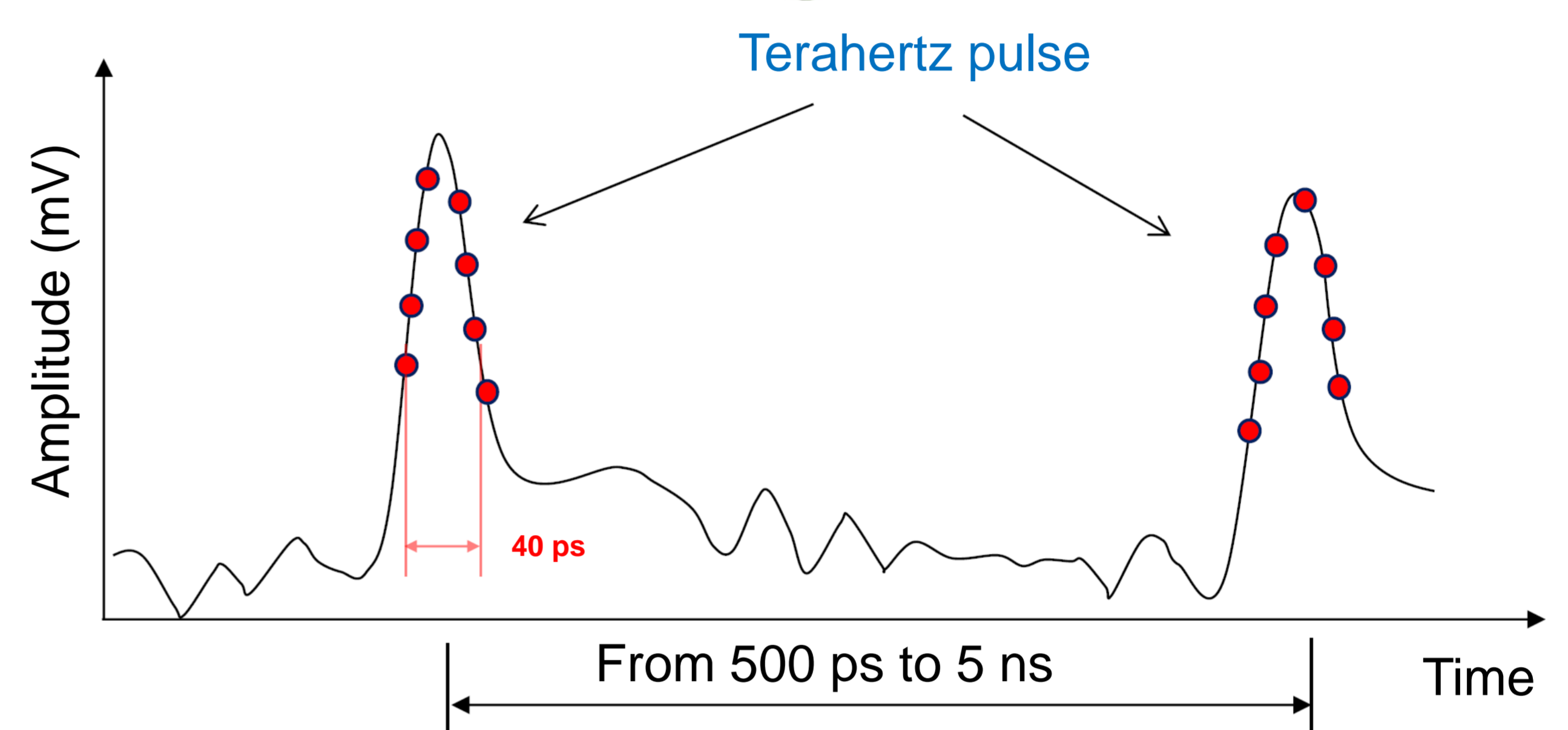
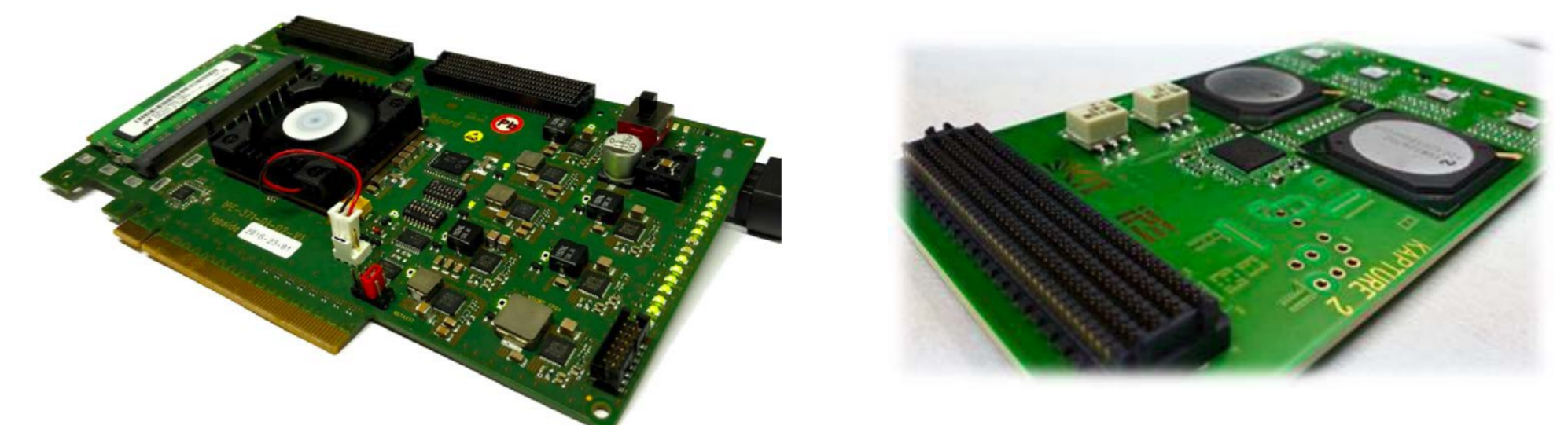
A picosecond sampling system for continuous sampling of ultra-short pulses generated by THz-detectors

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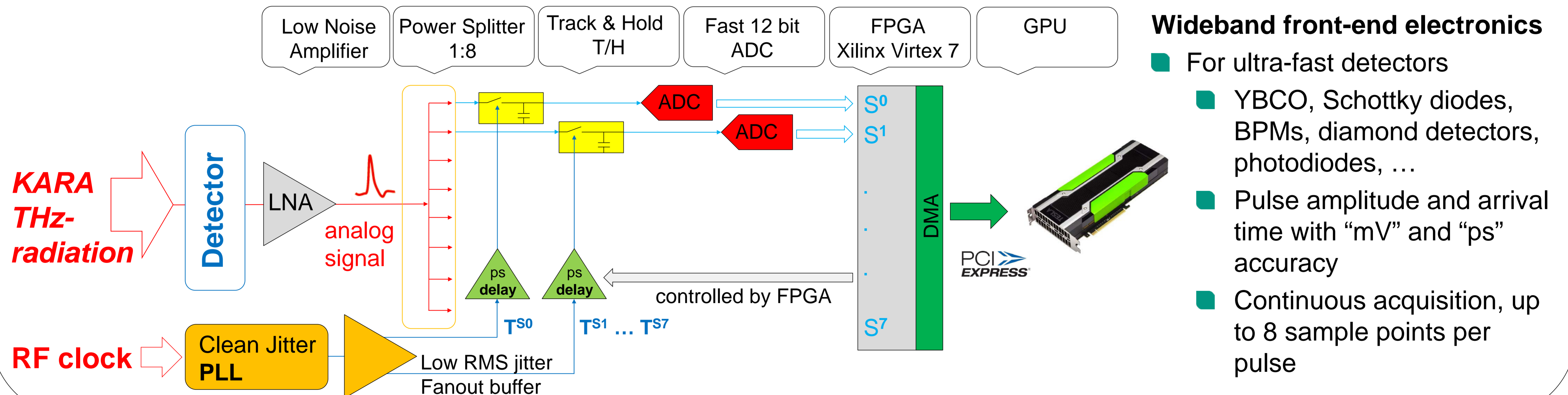
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KAPTURE 2

- Up to 2 GHz pulse repetition rate [1]
- Up to 8 sampling points (12 Bit ADC) per trigger
 - 2 x 4 channel KAPTURE 2 attached to HighFlex readout PCIe card
- Continuous readout by PCIe, up to 52 Gb/s
- 18 GHz analog bandwidth
- 3 delay units
 - 330 ps global (6 steps)
 - 25 ps global (12 steps)
 - 3 ps individual (32 steps)
- Supports two operation modes
 - Single shot amplitude detection of 8 detectors [2]
 - Pulse reconstruction with 8 points of single detector

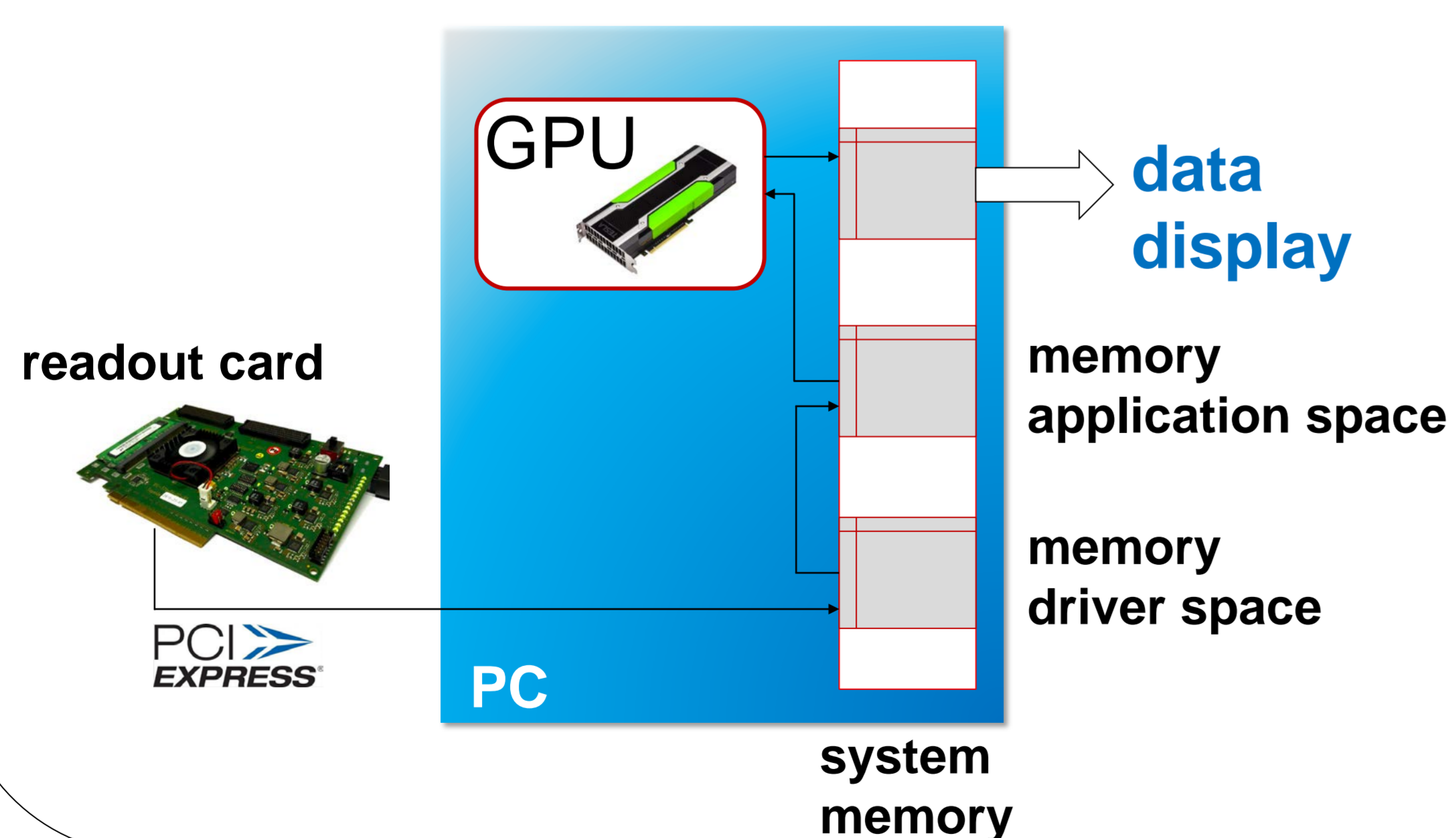


KAPTURE 2: Experimental setup

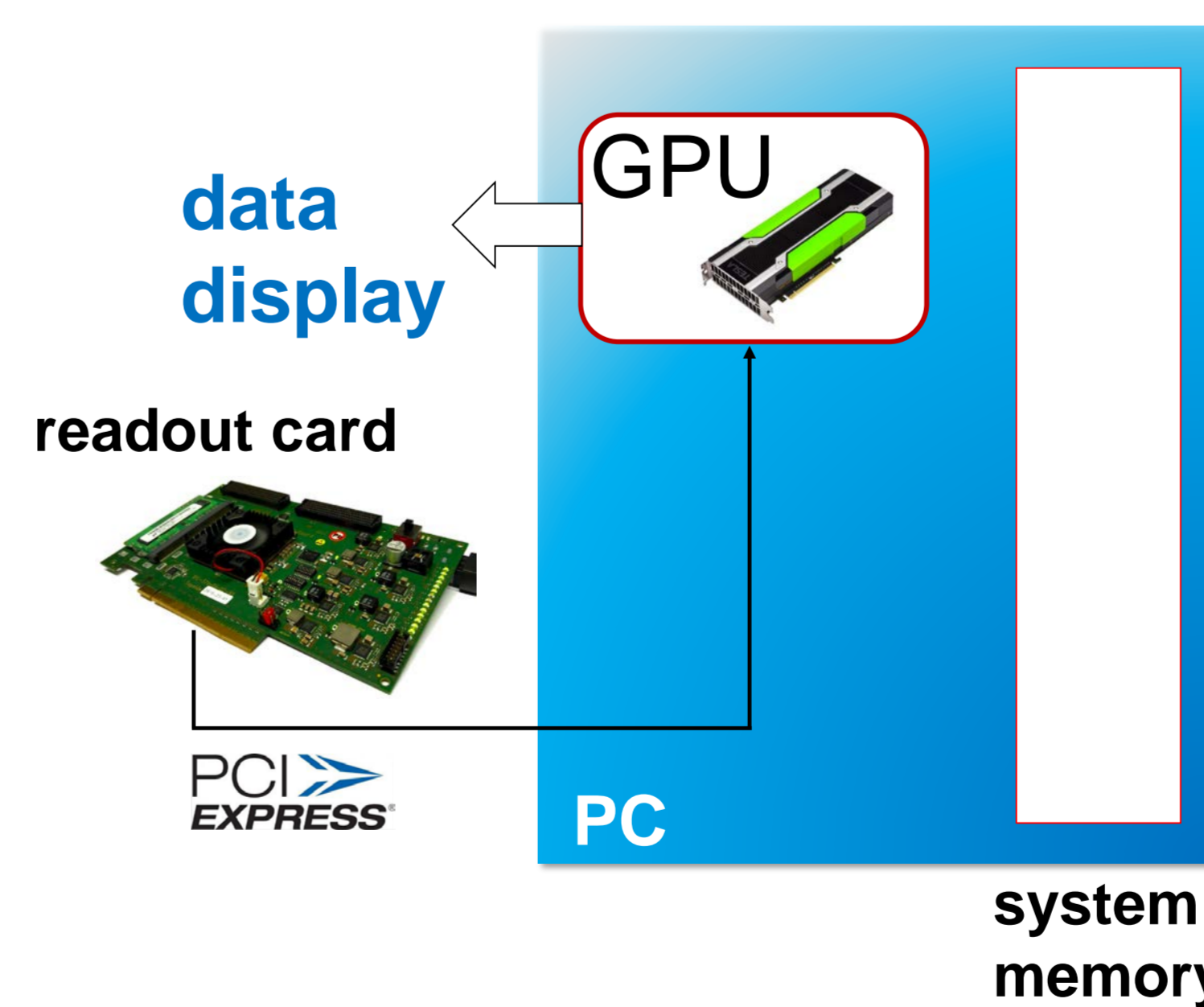


KAPTURE 2: FPGA - Direct Memory Access to GPU

Traditional DMA



DirectGPU DMA



- CPU and system memory are not involved
- FPGA sends data to allocated GPU memory directly by physical address

[1] KAPTURE-2. A picosecond sampling system for individual THz pulses with high repetition rate
M. Caselle, L.E. Ardila Perez, M. Balzer, A. Kopmann, L. Rota, M. Weber, M. Brosi, J. Steinmann, E. Bründermann, A.-S. Müller
Journal of Instrumentation, vol. 12, no. 01, p. C01040, 2017. doi: 10.1088/1748-0221/12/01/C01040

[2] Continuous bunch-by-bunch spectroscopic investigation of the microbunching instability
Steinmann, J. L.; Boltz, T.; Brosi, M.; Bründermann, E.; Caselle, M.; Kehrer, B.; Rota, L.; Schönfeldt, P.; Schuh, M.; Siegel, M.; Weber, M.; Müller, A.-S., 2018. *Physical review accelerators and beams*, 21 (11), 110705. doi: 10.1103/PhysRevAccelBeams.21.110705

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