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# SP9: Next Generation Field Detectors

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For a reliable and robust operation of free-electron lasers with bunch-arrival time variations on the sub 10fs scale, the short-term and long-term stability of the cavity field is an important factor.
Modern field-detectors using the non-IQ sampling scheme achieve at 1.3GHz operating frequency 0.01% amplitude, respectively 0.0035deg phase or 4fs stability within a measuring bandwidth of 1MHz. Front-end mixer, LO-geenration and todays available sampling ADCs are the main limitations. To overcome their 1/f-noise, we investigate interferometer based amplitude and phase detectors. In detail we compare conventional phase noise measurements using saturated mixers and interferometric techniques.

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