### **Programme Matter and Technologies**

# **Towards Attosecond RF Controls for Accelerators**

ARD-ST3 Picosecond and Femtosecond Electron and Photon Beams

## State of the Art LLRF controls

### State of the art digital LLRF (low-level radio frequency) controls









#### **General limitations of todays field detectors**

Non-IQ field detector (noise balanced)





### Matthias Hoffmann, DESY

## **Detectors for Attosecond LLRF controls**

Apply substantial new detector concepts for 1/f-noise reduction

Overcome ADC noise limitation by RF amplification <u>before</u> IQ-detection using a carrier suppression



Limited spectral density of available best ADCs







Linear Technology (2007)

Analog Devices (2009)

Texas Instruments, (2012)







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