# A New High-Rate and High-Resolution X-ray Spectroscopy Detector for Synchrotron XRF and XAFS Applications

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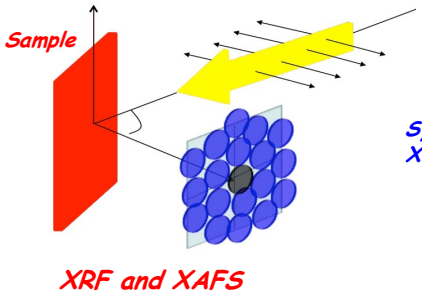
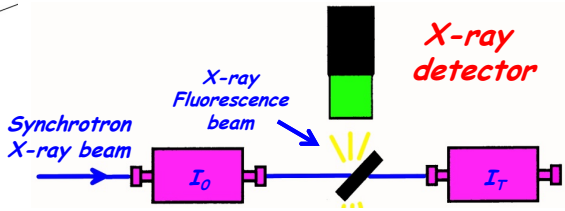
## Introduction

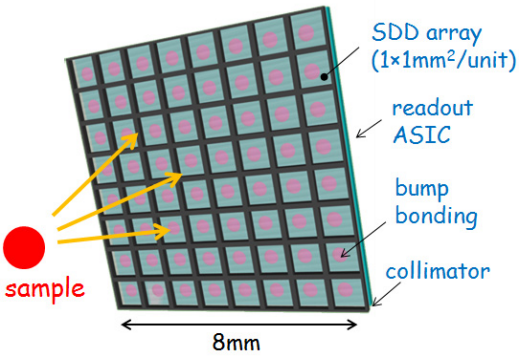


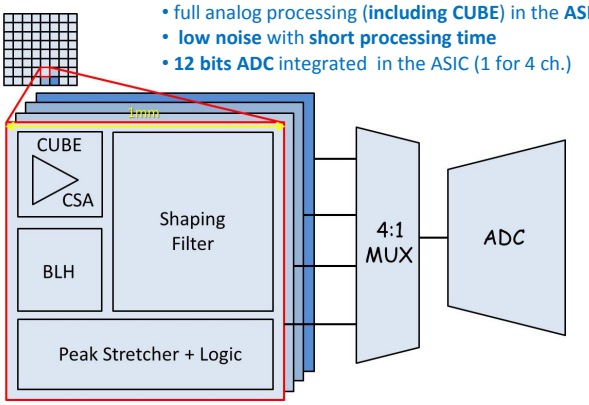

- **Silicon Drift Detector** is widely used in X-ray spectroscopy applications at **synchrotron** facilities (**XRF, XAFS**)
- **High-rate performances** of current SDD-based detection systems will be further challenged by synchrotron upgrades (**x 10-100** beam-on-sample fluxes increase)

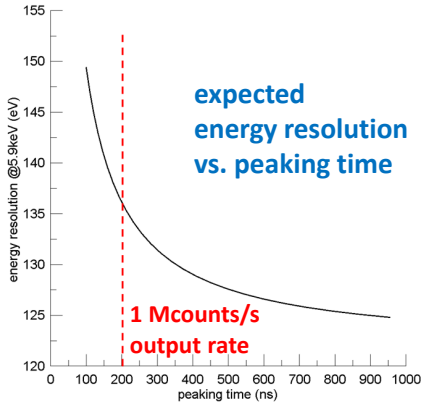
## The Idea/Concept

A new X-ray spectroscopy detector:
- **higher count rate capability**
  - larger number of channels (e.g. **64**)
  - increase of count-rate capability per channel (**>1Mcounts/s/ch**)
- **(still) good energy resolution**
  - close to optimum one (**<150eV**), but at high count rates
- **modularity** (e.g. 2-4 tiled modules)

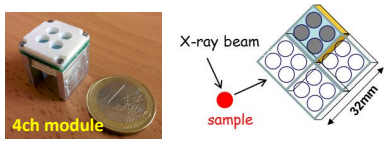


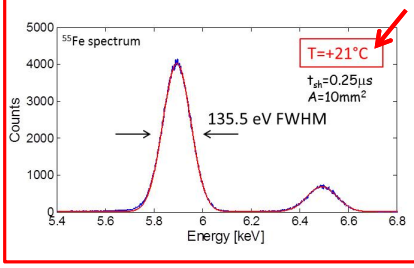

Detector design approach:
- **monolithic SDD** array **bump bonded** to a **readout ASIC**
  - **high channels density**
  - **'optimum'** electronics readout
  - **direct digital output** (on-chip ADC)
  - close to **room-T** operation



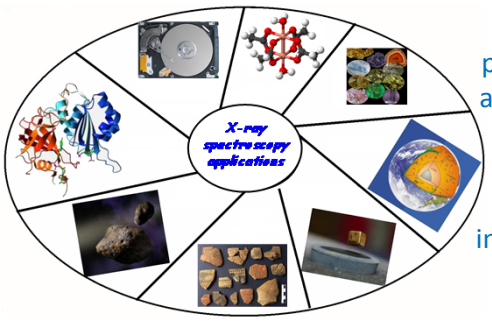

Precursor detector:
**ARDESIA**




## Potential Impact

High-rate (**>100Mcounts/s**) X-ray spectroscopy detector for **wide range of synchrotron applications**




potential impact also in **industrial applications** (e.g. X-ray analytical instrumentation)