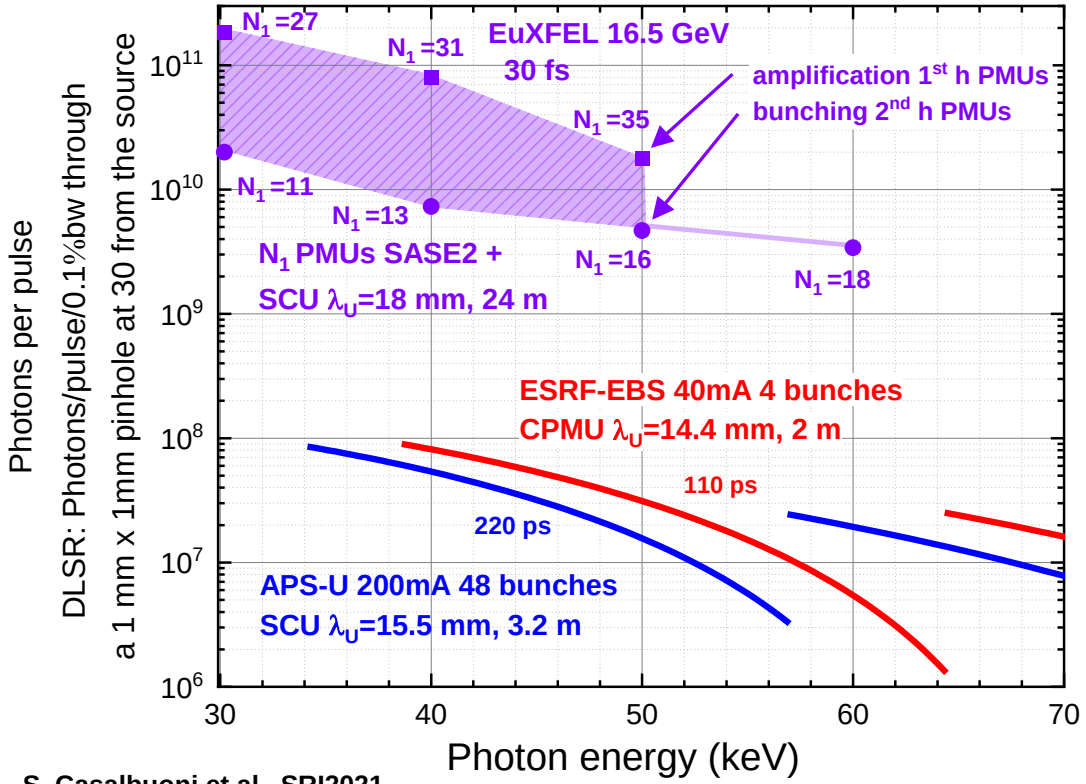
SCU afterburner planned at EuXFEL

Normalized emittance	0.4 mm mrad
Initial energy spread	3 MeV
Current	5 kA

The simulations do not consider wake fields and tapering. A flat top 3 fs bunch is considered



S. Casalbuoni et al., SRI2021

- Estimated range of photons per pulse achievable by tuning the SCU afterburner on the fundamental
  - amplifying the output of the fundamental of the PMUs

Photon energy	Increase photons per pulse SCU to SASE in PMUs
30 keV	factor 2
40 keV	factor 3.3
50 keV	factor 5

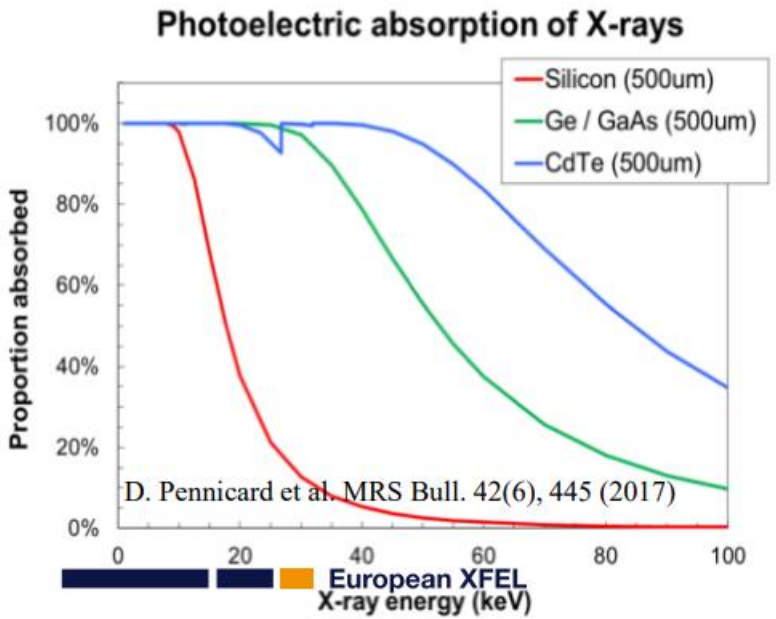
  - using the bunching of the second harmonic of the PMUs

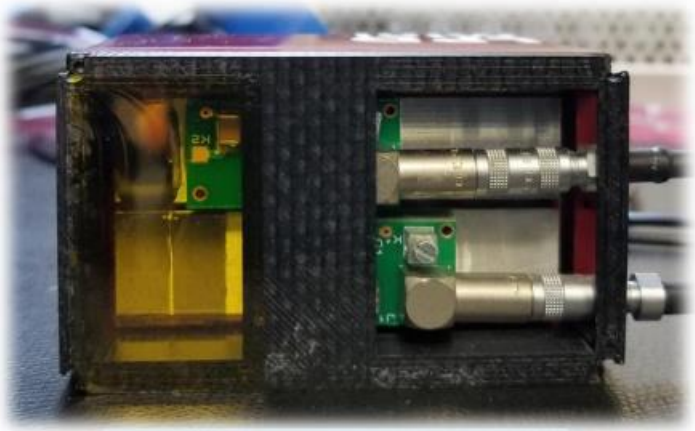
C. Lechner et al., SRI2021 and FEL2022

Hard X-rays detector development

The quantum efficiency of silicon drops significantly around 20 keV

- The worldwide community is working in a coordinated way to ensure provision of appropriate material to detector developers, the most promising option being high-flux CdZnTe. **The material availability is a very critical issue for detectors!**
- EuXFEL is already working with partners in the characterisartion of materials and detectors (EuXFEL beam is unique in terms of rates and brilliance)
- EuXFEL priority is to provide to users a detector for very hard X-rays (2028-2030)





LPD with CZT prototype, courtesy STFC