

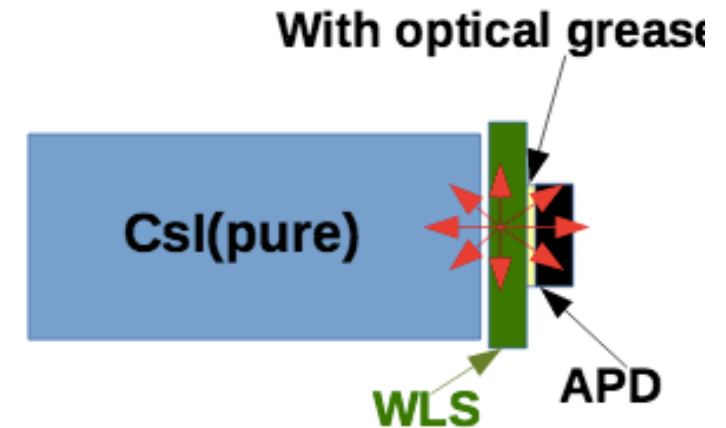
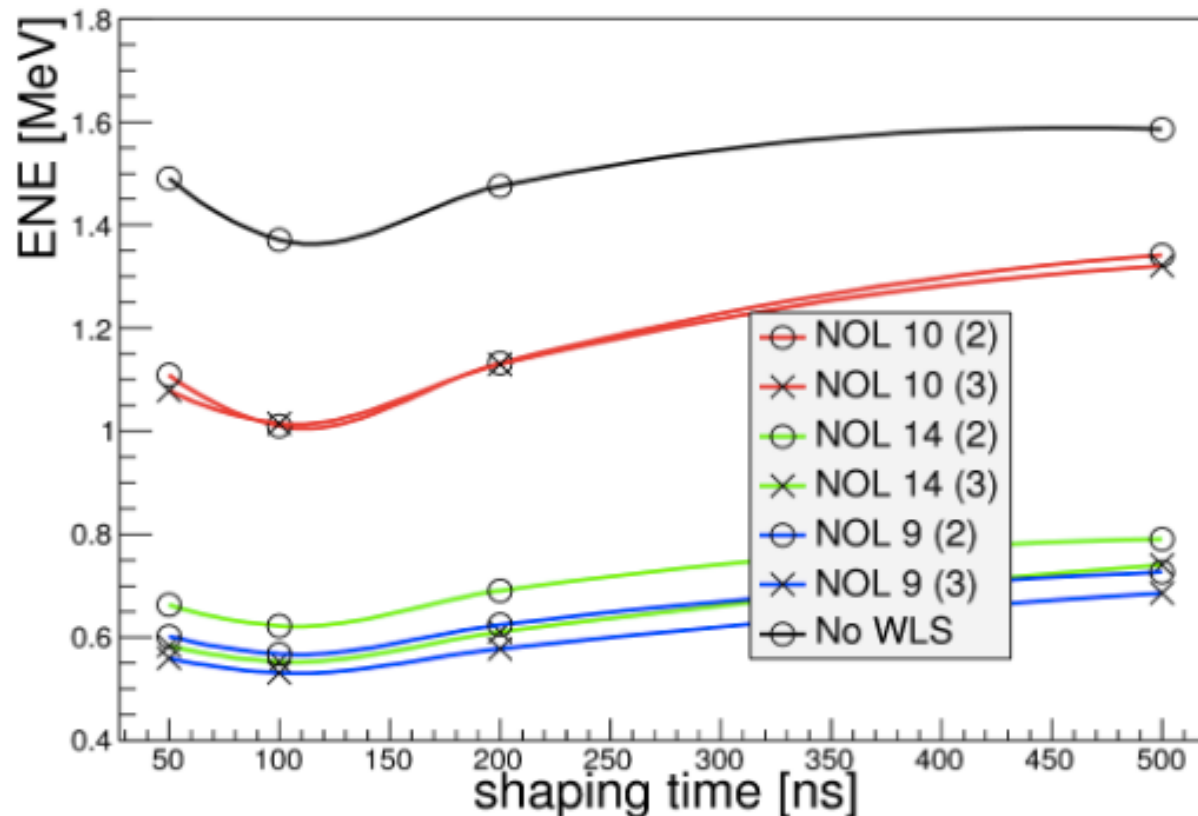
ECL status report and outlook

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for the ECL Italian ECL group

Outline

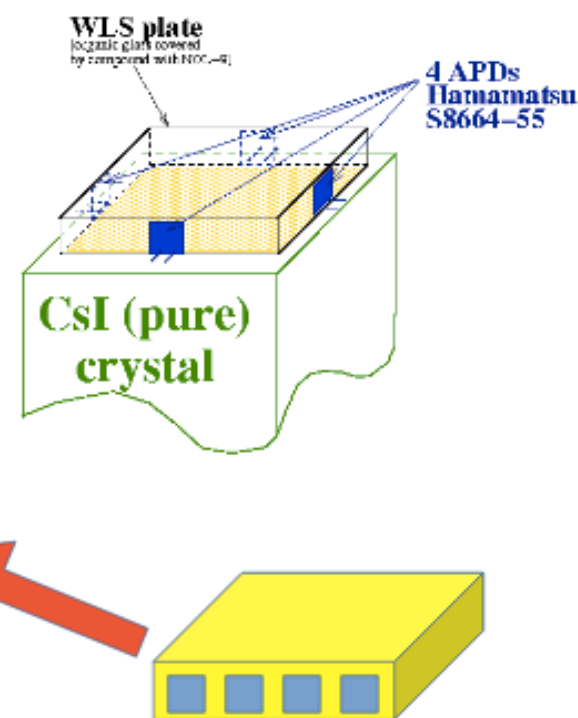
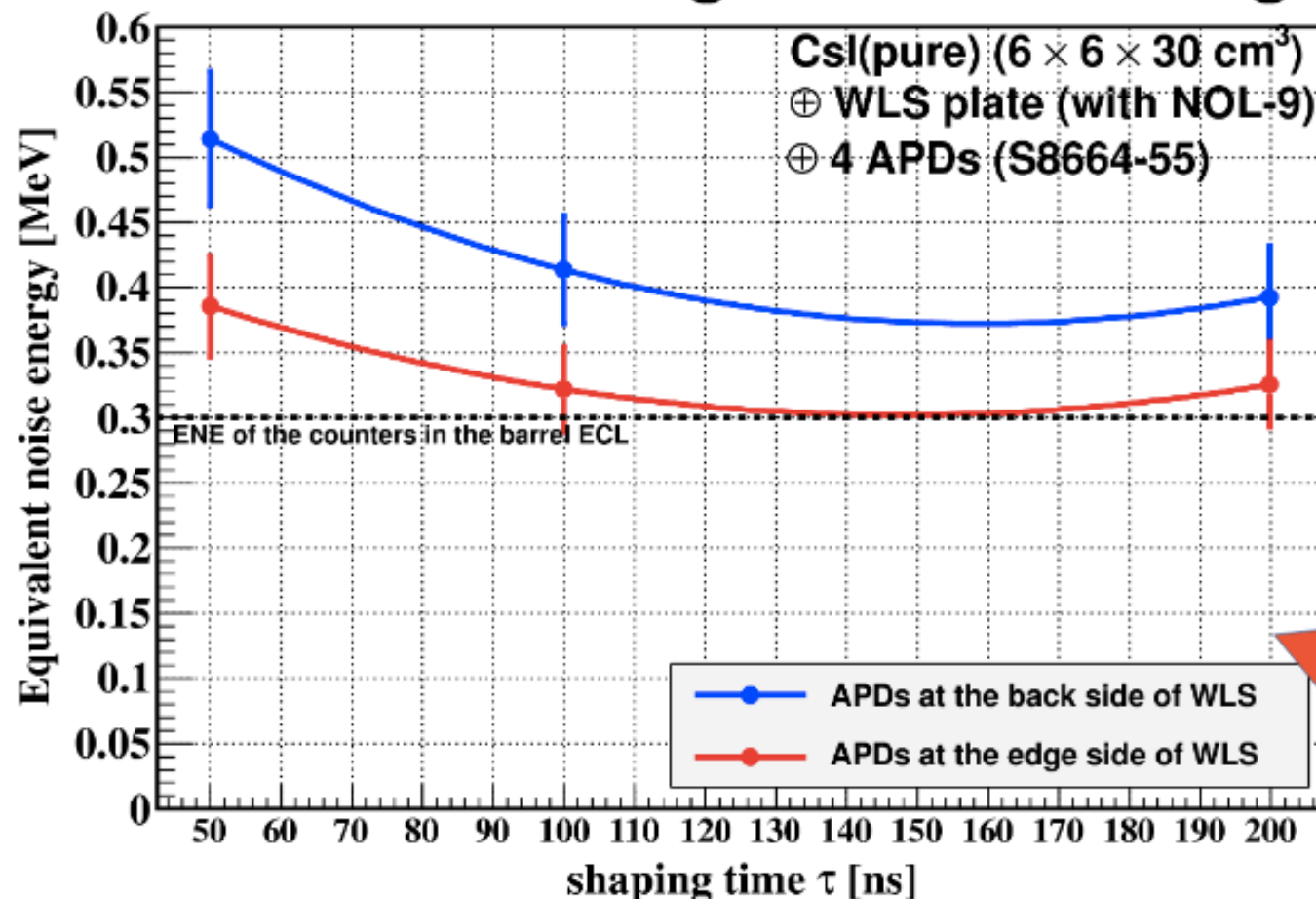
- Short update of the FWD upgrade (news)
- Future

Results with WLS plates



NOL-9 turns out to be the best WLS that provides an enhancement on signal by a factor of about 3.

Attaching APD's on edge side

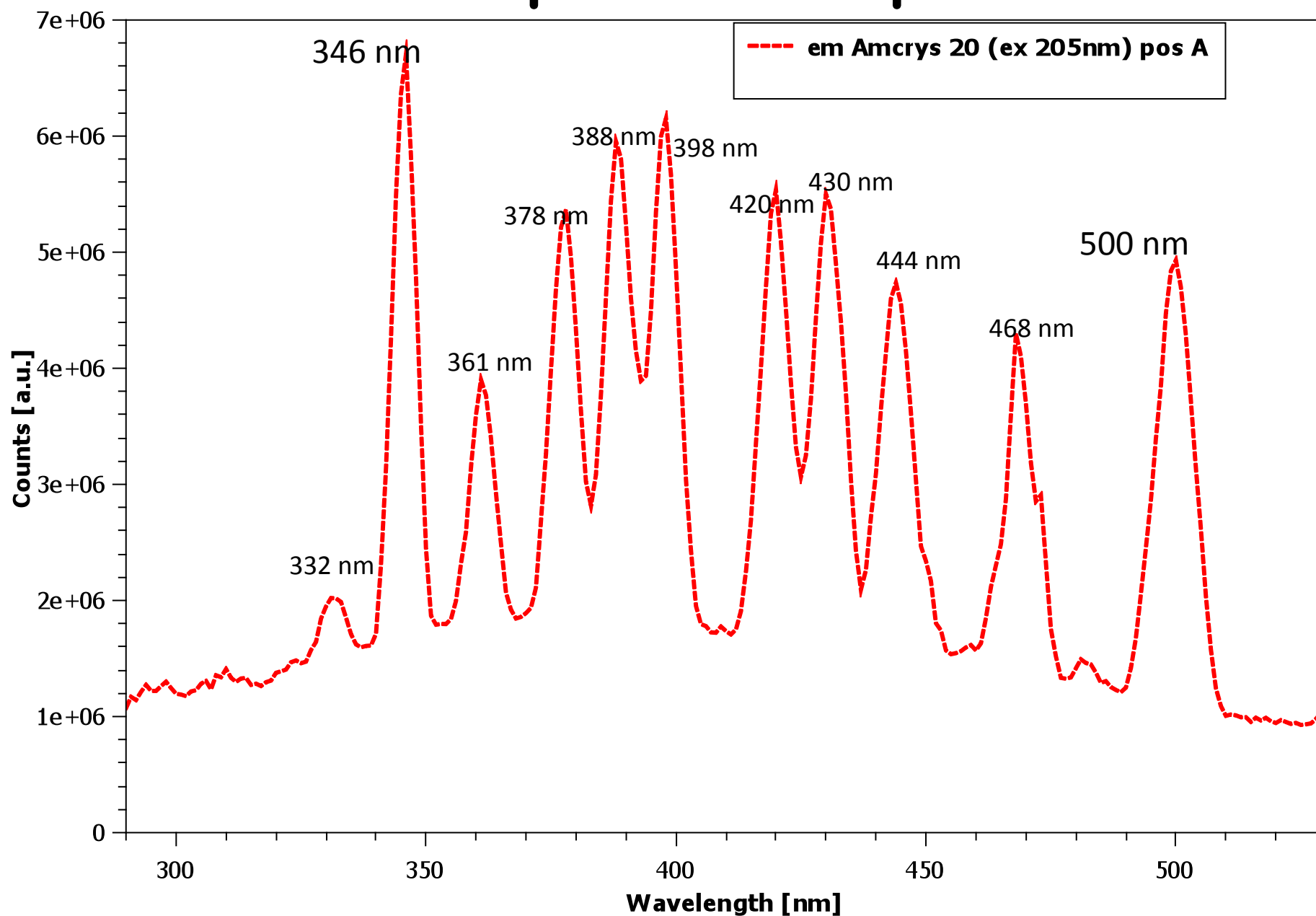


In this measurement, the APD's are attached on one side of the edge due to the limited space of our shield box.

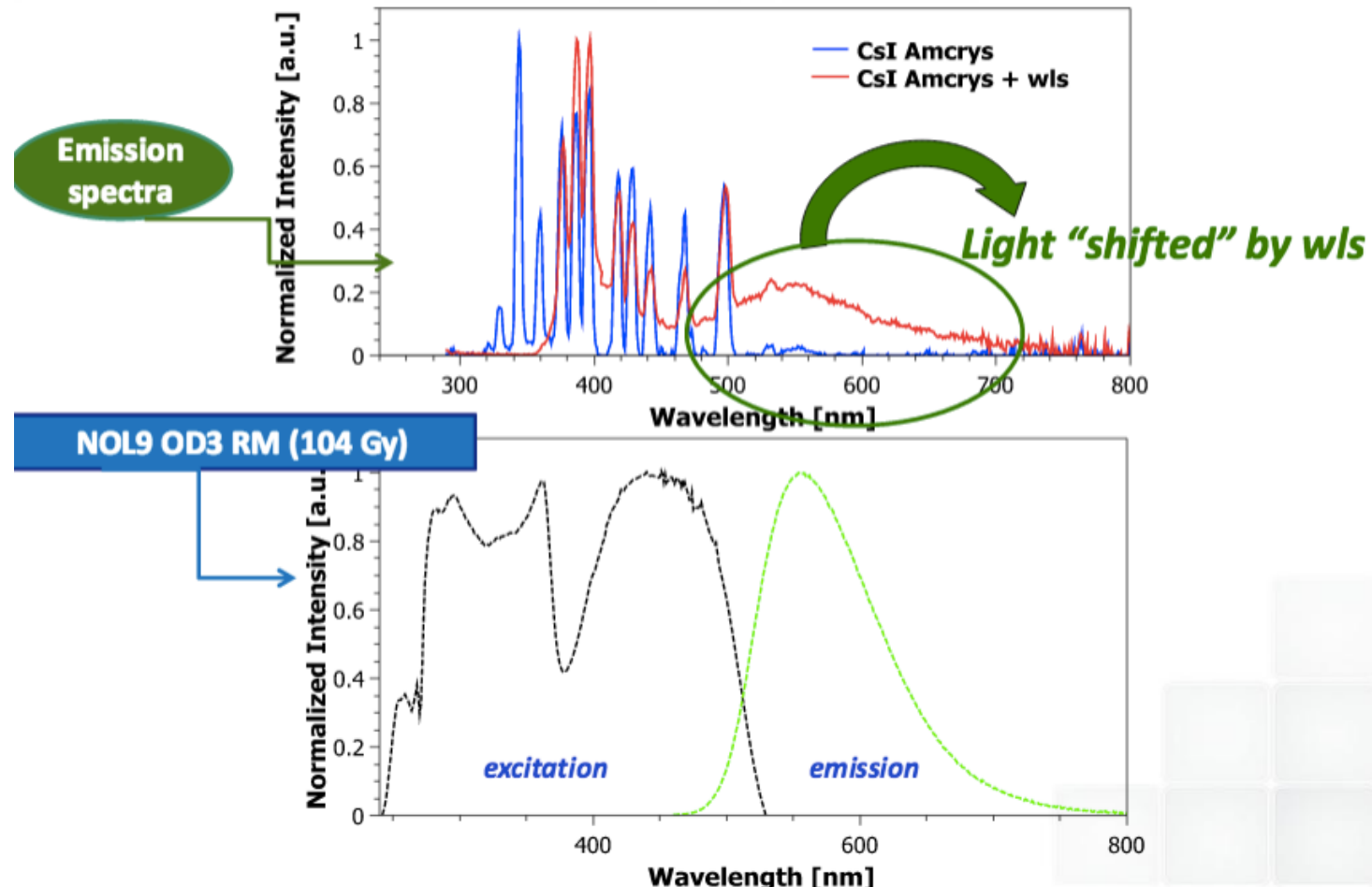
A factor of 1.3 is earned by this configuration.

In total, in comparison with the coupling of APD's to the crystal, we earned a factor of 4.

Emission spectrum pure CsI

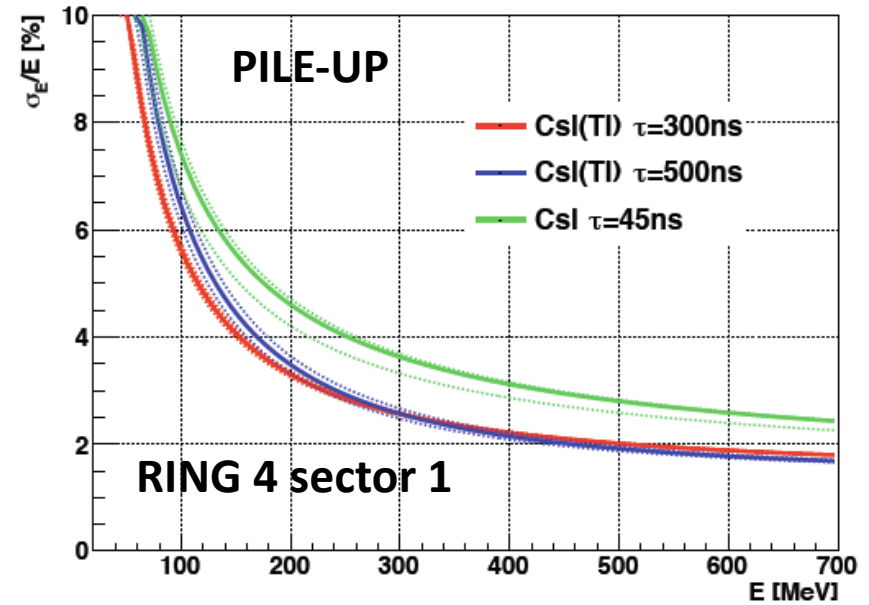
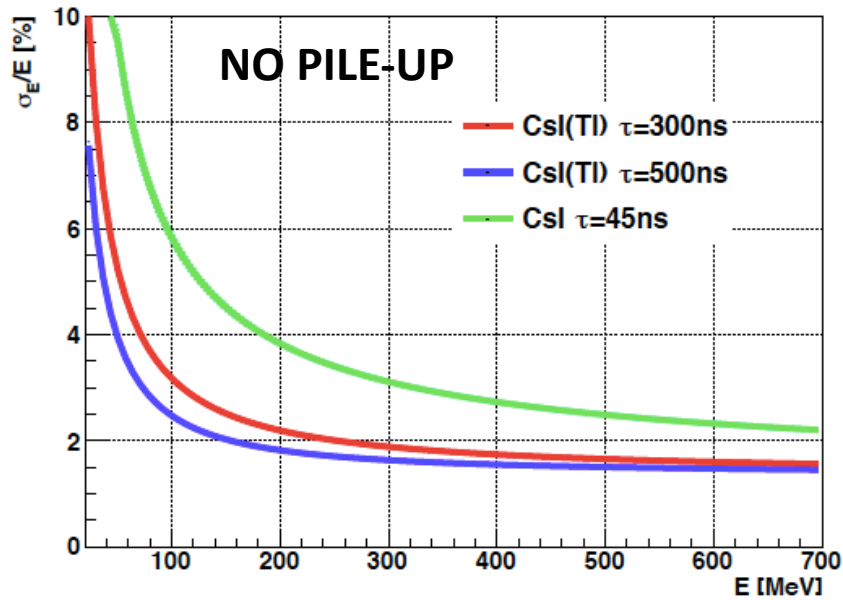


Emission with WLS spectrum of pure CsI

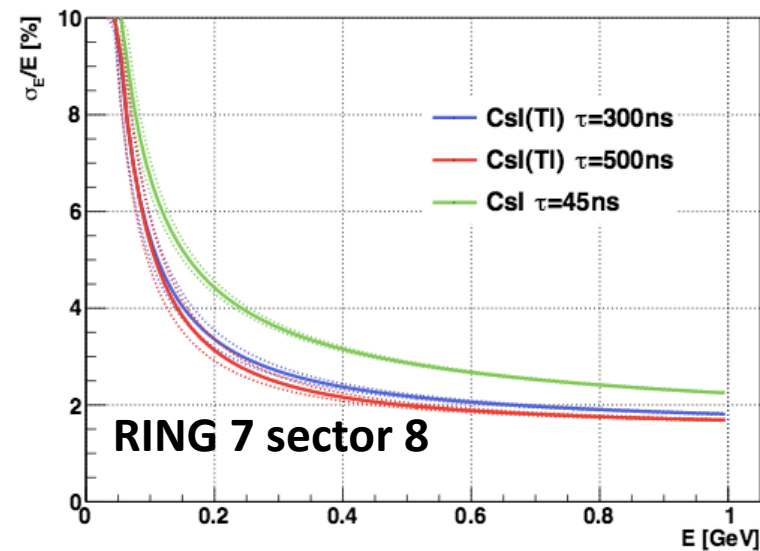
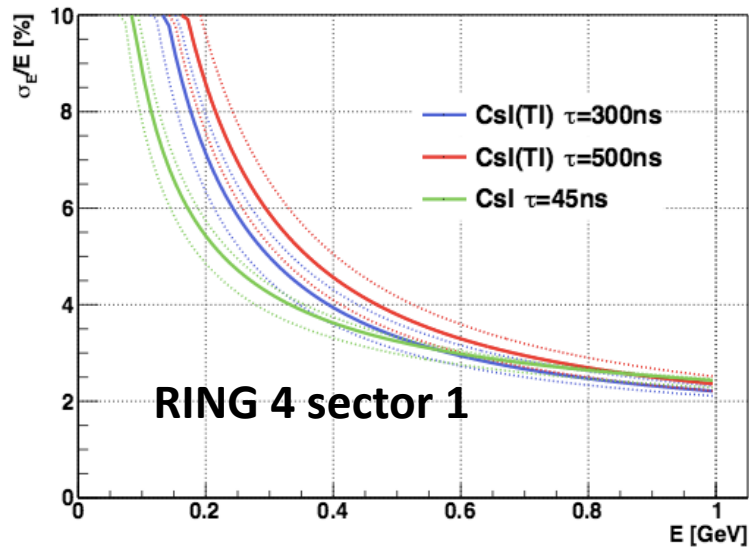


Cut with a filter the slow component of the light in order to avoid as much as possible the pile-up → shift the light with a WLS in the region where the QE of the APD is highest

Results of a toy MC for the pile-up study

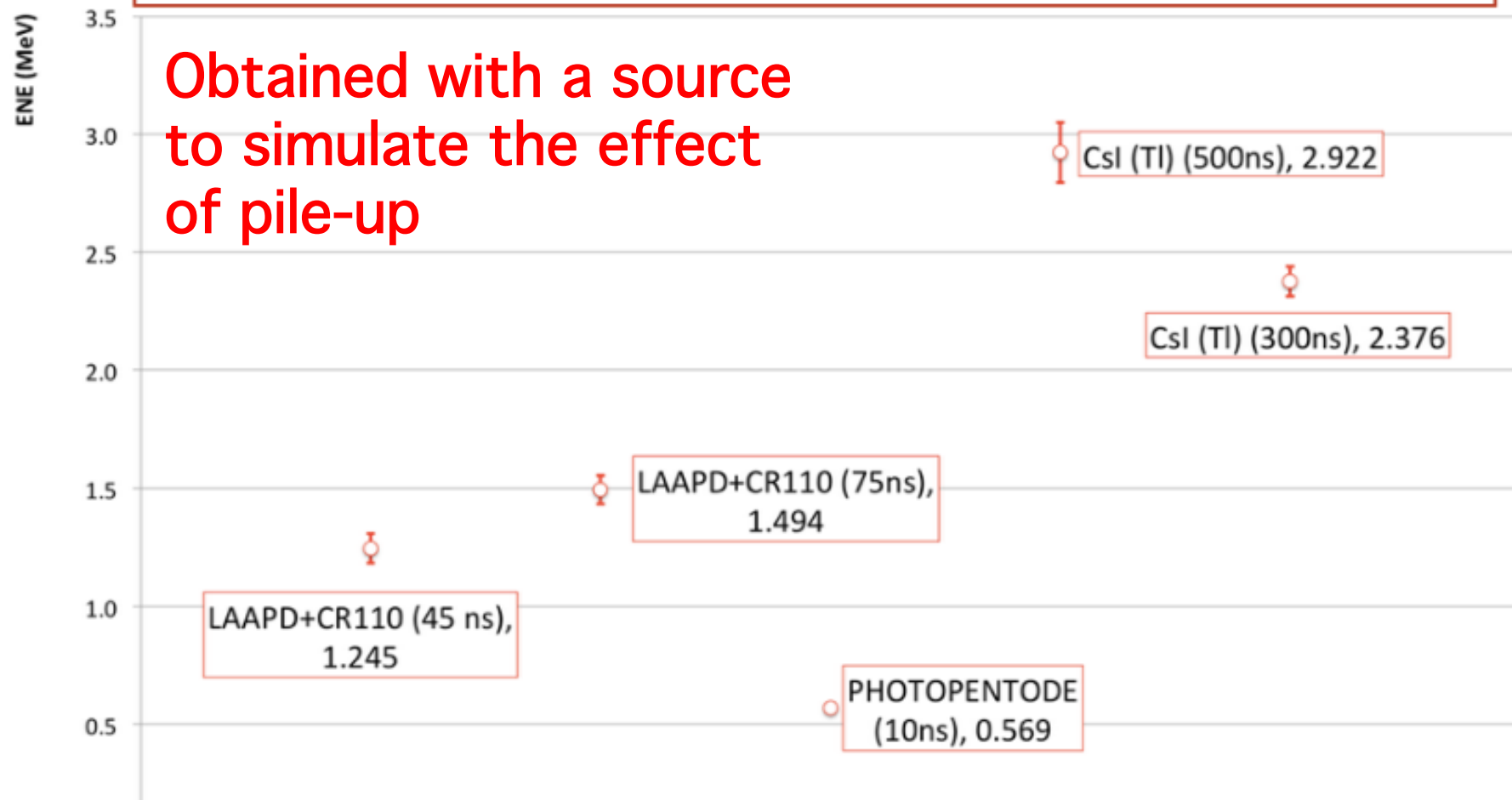


SAFETY FACTOR X3 PILE-UP (hit/ μsec x 3)



The contribution to the ENE of the pile up can be extracted from the difference in quadrature of the previous measurements

Obtained with a source to simulate the effect of pile-up

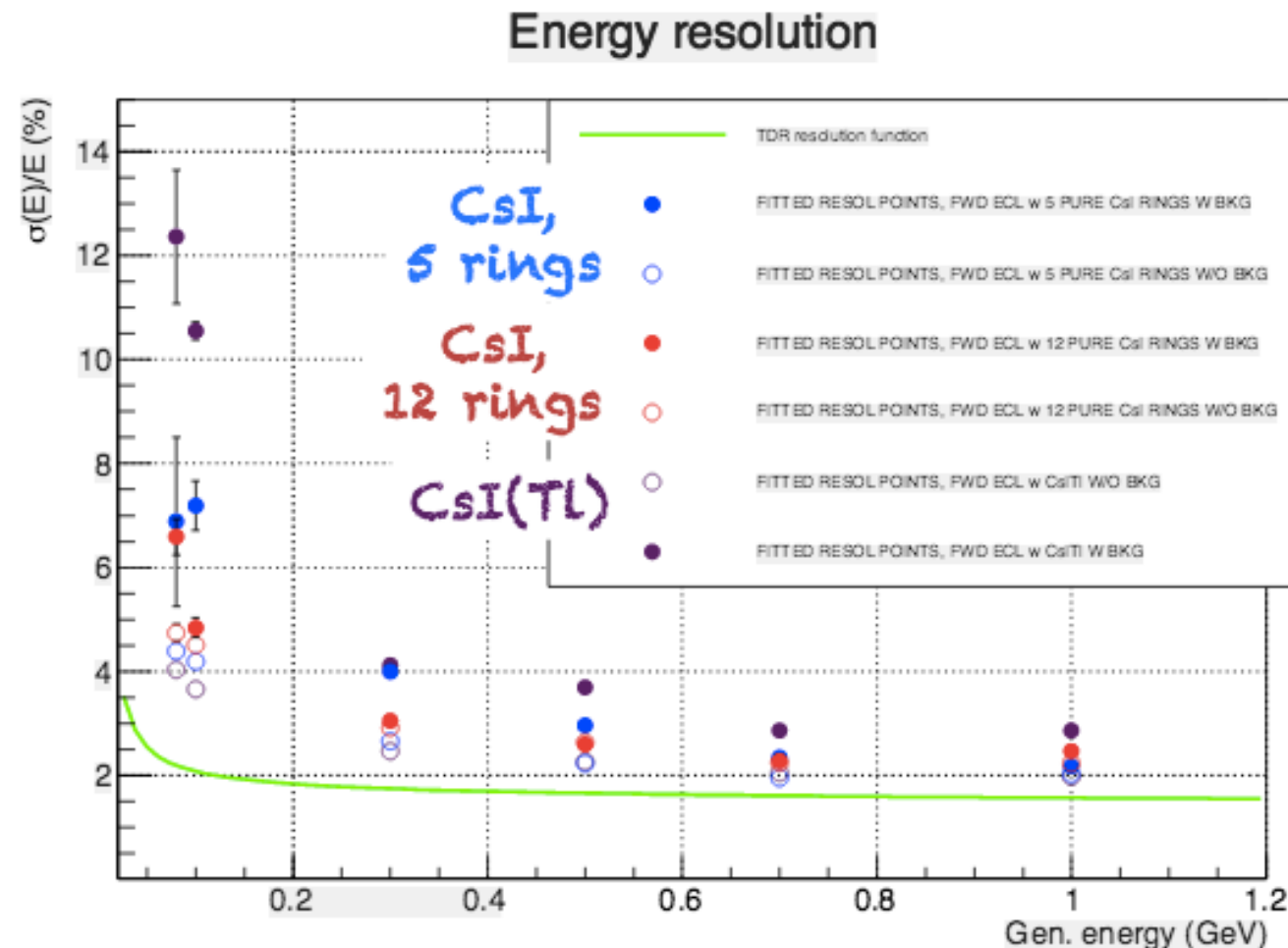


Doped CsI has ~twice the ENE of pure CsI from pile-up, in agreement with the results obtained with the simulations

Full simulation of pure CsI

Replacing CsI(Tl) rings with pure CsI

With current reconstruction code and parameter set, resolution with CsI-12 rings + machine bkg at the level of bkg-free performances



Conclusions and outlook

- A reliable simulation of the background is mandatory to understand the impact of the FWD upgrade
- The R&D has shown that S/N ratio is compatible with our request. The best coupling of crystals to APD and to WLS have to be defined
- The slow component of the light remains the real problem against pile-up → the use of a proper filter before the WLS can help in this purpose
- Full sim shows a sensible improvement in repalcing rings of CsI(Tl) with pure CsI → 12 rings resolution comparable with no bckg configuration

Dettagli sulla schedule dei prossimi mesi

- test filtri+ WLS (filtri ordinati, fare misure)
- impatto delle performance ottenute con FULL SIM sulla fisica
- studio della opzione Csl(TI) con APD di lettura →
 - riduzione del pile-up attraverso una riduzione del tempo di integrazione del segnale compensata dal guadagno ottenuto con la lettura con APD
- Tutto per GIUGNO 2016
- Da Giugno il carico di lavoro su R&D sarà vicino a zero (fine R&D Csl puro + fine studio Csl(TI)-APD MANDATORY) o al max qualche piccola coda
- Tre persone che dovessero decidere di dedicarsi al readout the KLM in coda alla chiusura dell'R&D ECL non creerebbero alcun buco nel lavoro di ECL che sarà da quel momento maggiormente dedicato alla fisica, al software di ricostruzione, alle calibrazioni....

- Dati di BEAST: primi fasci hanno circolato nella macchina dalla scorsa settimana → Phase-1 commissioning iniziato 1 Febbraio
- Simulazione beam loss phase-1 disponibile
- Analisi dati per fine 2016
- BEAST PHASE2 Novembre 2017
- Risultati sulla misura dei fondi metà 2018
- 2016 fine R&D + FULL-SIM + IMPACT ON PHYSICS → valutazione importante dell'upgrade
- 2018 misura fondi macchina → nuova valutazione sperimentale delle necessità di upgrade (con o senza sostituzione dei cristalli)
- 2018 discuteremo con la collaborazione e con la CSN1 l'upgrade di ECL. Il costo unitario è noto, ma il piano finanziario complessivo per la sostituzione dei cristalli oppure solo dell'elettronica dipenderà da quanti ring si devono sostituire, e lo share INFN dipenderà da quali altri partner ci saranno.