ECL forward for BelleII experiment

OUTLINE:

- **Introduction**
- **R&D on pure CsI + APD/Photopentodes**
- **planning**

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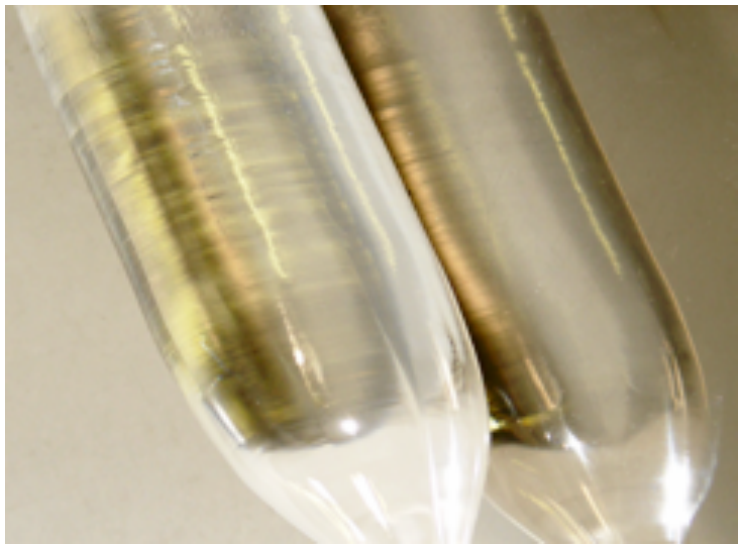
Introduction

FORWARD Calorimeter of BelleII experiment:

1150 crystals of CsI(Tl) to be replaced with pure CsI:

- **same dimensions of CsI(Tl) → mechanics**
- **fast crystal (30 ns decay time) to avoid pile-up and occupancy**
- **rad hardness good**
- **very low light yield**

R&D on readout of the crystals is fundamental for the project to obtain a good energy resolution at relatively low energy with very low light output



READOUT for pure CsI crystals

Two options:

1) **Photopoentodes**
   a) **high Q.E., high gain, small capacitance → very low E.N.E.**
   b) **Dimensions could be a serious problem for the mechanics**
2) **APD's**
   a) **Very well known devices, compact (redundancy), r rad hard**
   a) **high capacitance, stability in time has to be studied**

Studies of the two photodetectors have to be performed together with a detailed understanding of the space available in the detector.

Involvement of company for crystal production OPTOMATERIALS

http://www.optomaterials.com/

A group of INFN people has visited the company end of October

Scintillating Crystals produced

LuYAP – LuAP – LYSO – LSO – YbAP - Ce:YAG

Previous experience with INFN for other experiments. Crystals for medical other applications.

Labs are equipped with very modern machines for quality test of the products, cutting machines, polishing machines.

They have 7 furnaces in total and for pure CsI of large dimensions, like Belle2, they could buy a dedicated one.

They have grown in past pure CsI crystals of small dimensions.

2 samples of big (5cmx5cmx30cm) CsI pure produced → just delivered to be tested

Planning

2015 choice of the photodetectors followed by study of FE electronics
interaction with people at KEK, for the test on photopentodes and for the study on the mechanics (6 m.u.)

2016 prodcution of the crystals and of the readout and development of the FE electronics and compatibility of the DAQ with the entire ECL DAQ system
permanence at KEK to understand the compatibility of FE and DAQ with the existent detector and implementation (9 m.u.)

2107 assembly of the detector and transportation to KEK for final test and commissioning (12 m.u.)

2018 installation at KEK (12 m.u.)