

# The Mu3e scintillating fibre detector R&D

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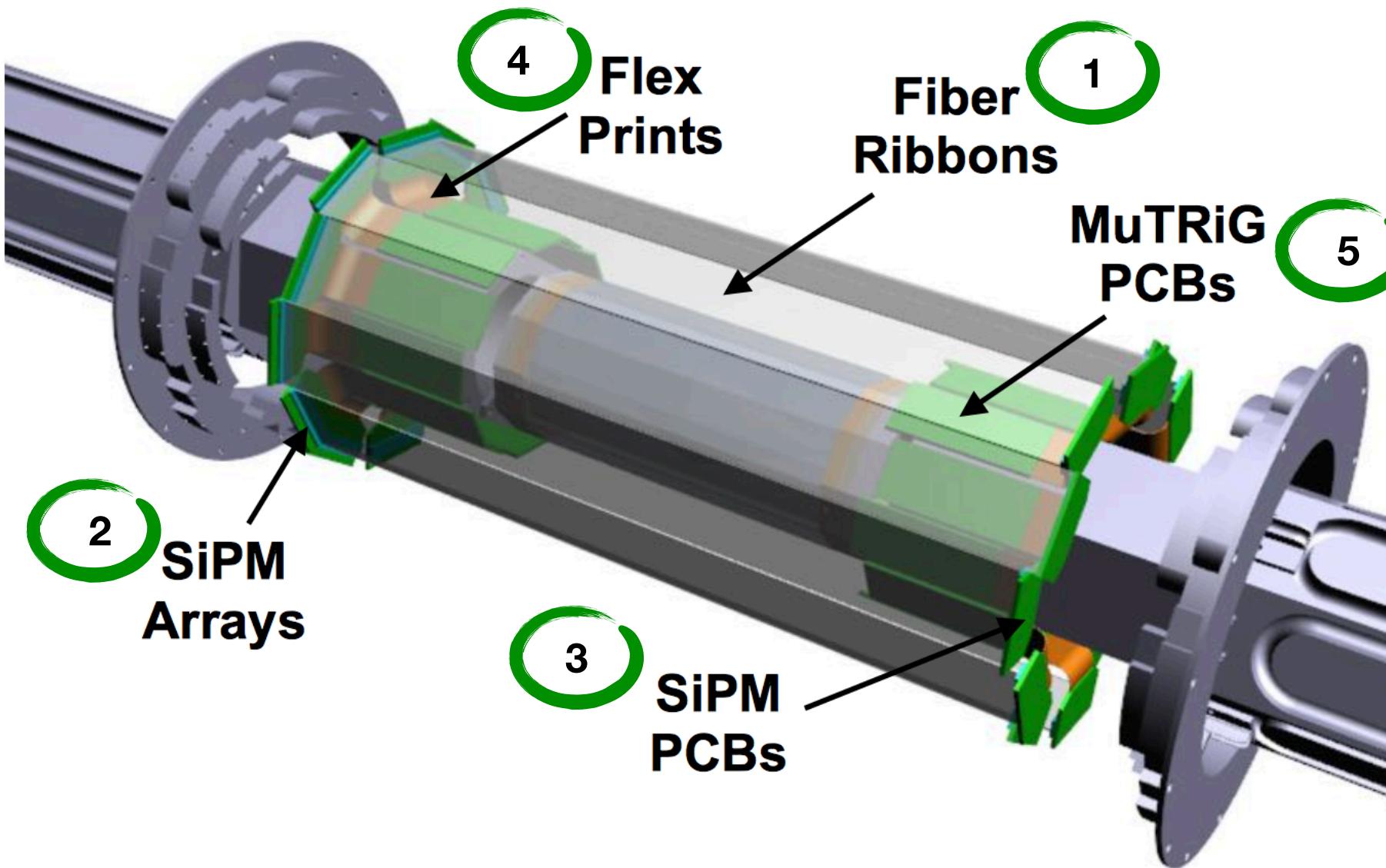
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## Goal

Detect m.i.p. with high efficiency, minimum amount of material for a sub ns time resolution with just few photoelectrons/fiber

## Requirements

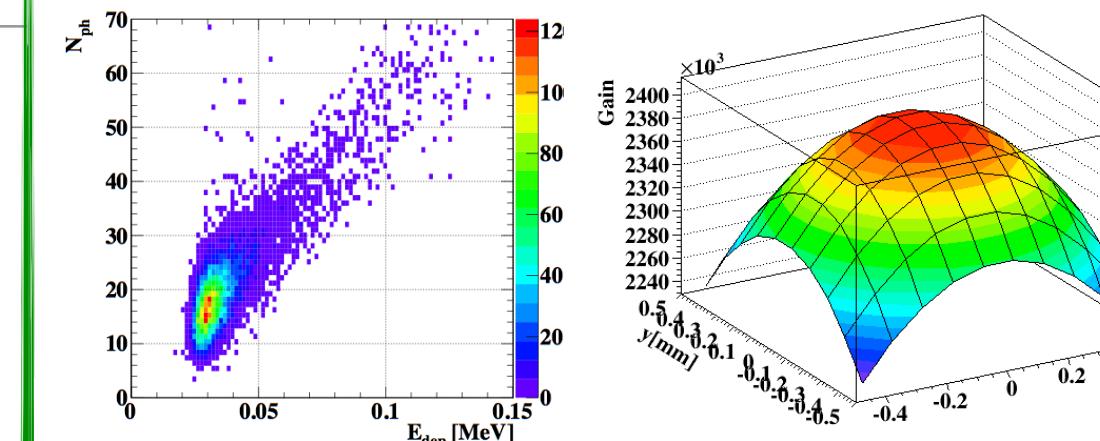
- < 900  $\mu\text{m}$  total thickness
- < 0.3 %  $X_0$
- time resolution  $\sigma < 1 \text{ ns}$
- rate up to 250 KHz/fiber
- very tight space for cables, electronics and cooling



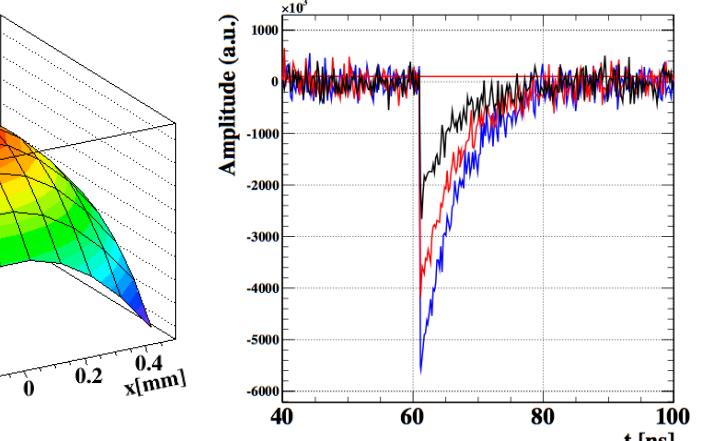
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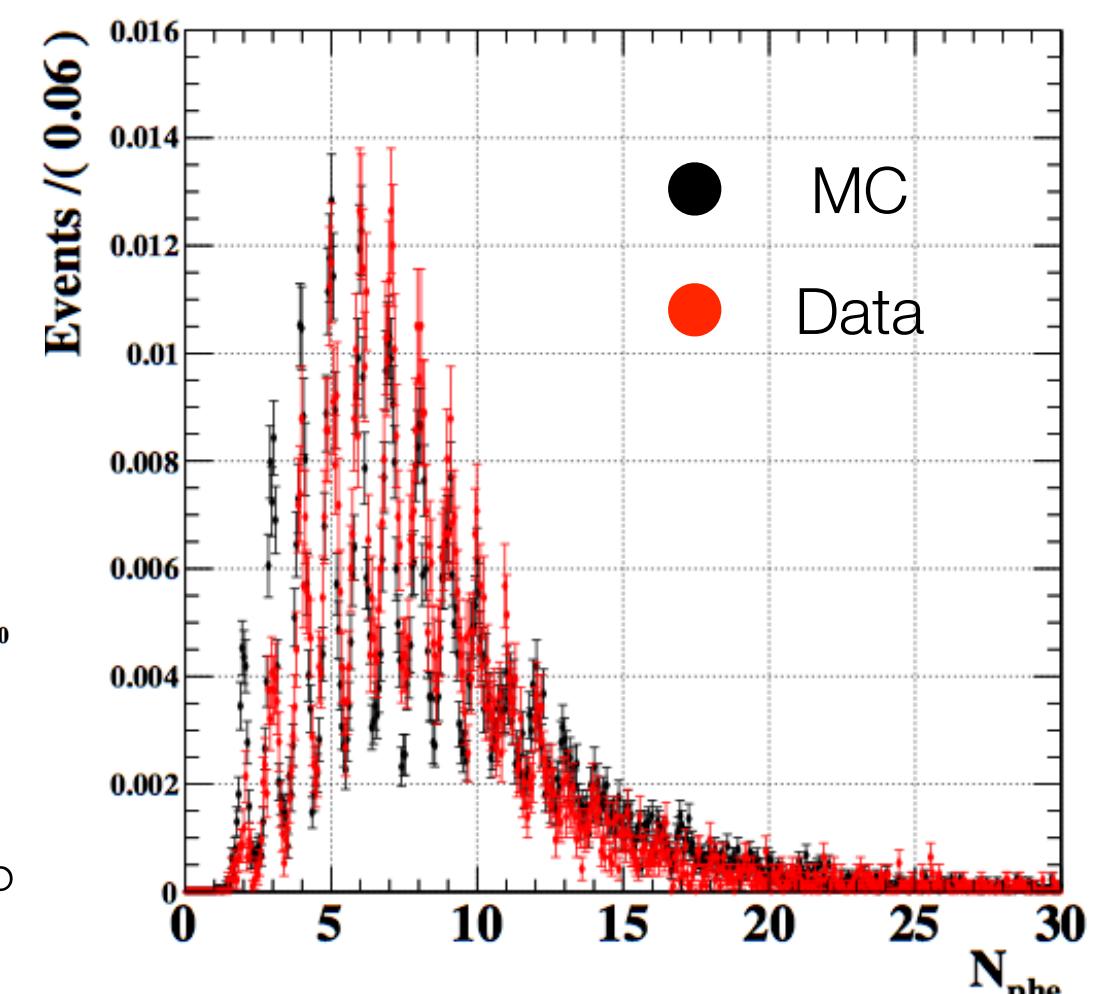
GEANT4



MPPC

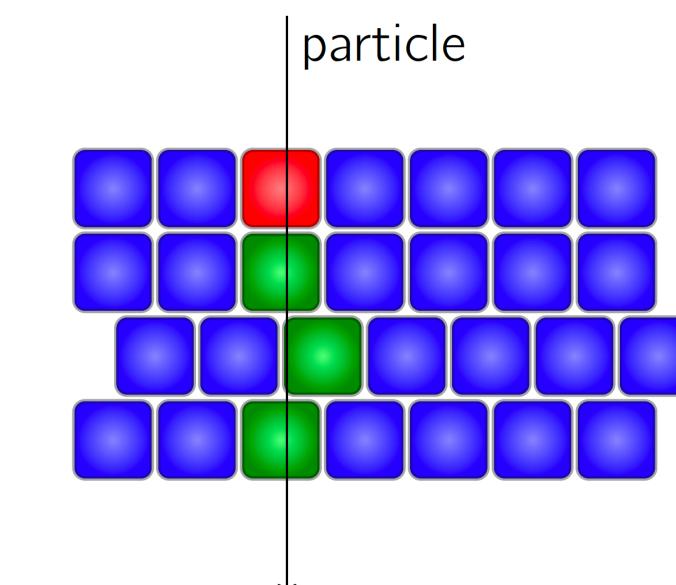


DAQ

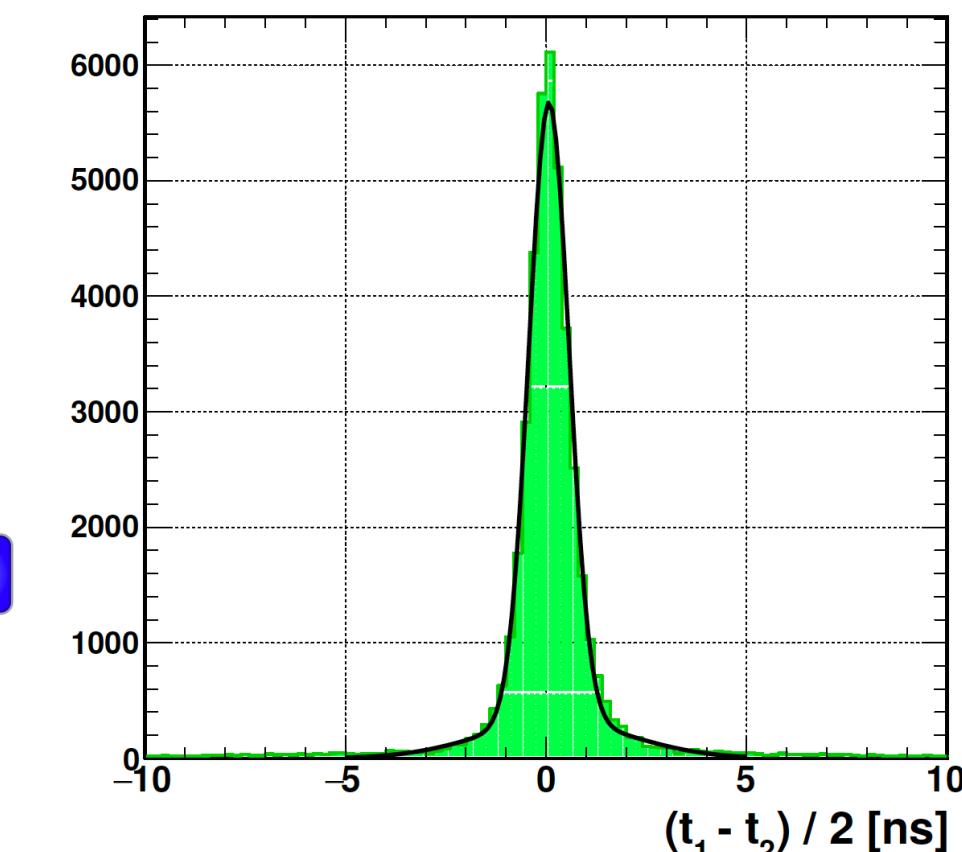


Analysis: Data vs MC

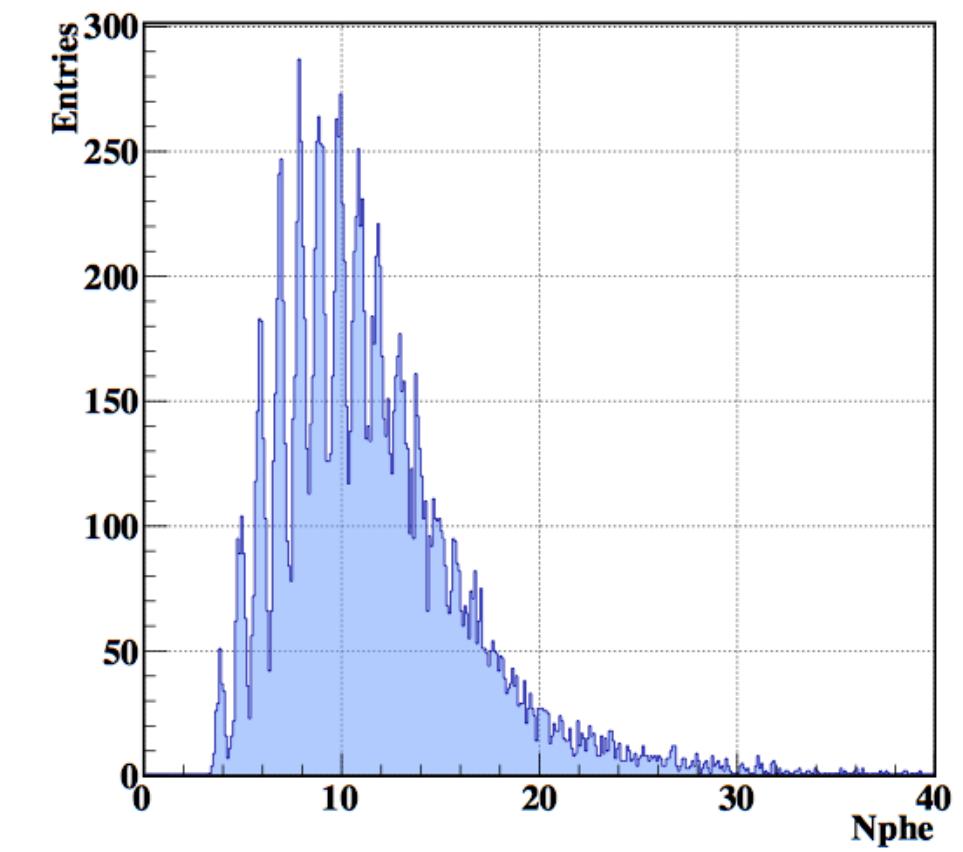
Trigger  
offline selection:  
hits in 3 layers  
MC SQ BCF12 Saint-Gobain  
Hamamatsu S13360-1350CS



3 layer time resolution  $O(550) \text{ ps}$



3 layer offline array charge collection (thr > 1.5 Nphe)



Addressed requirements with one of the first prototypes