

TIMING IN A FLASH

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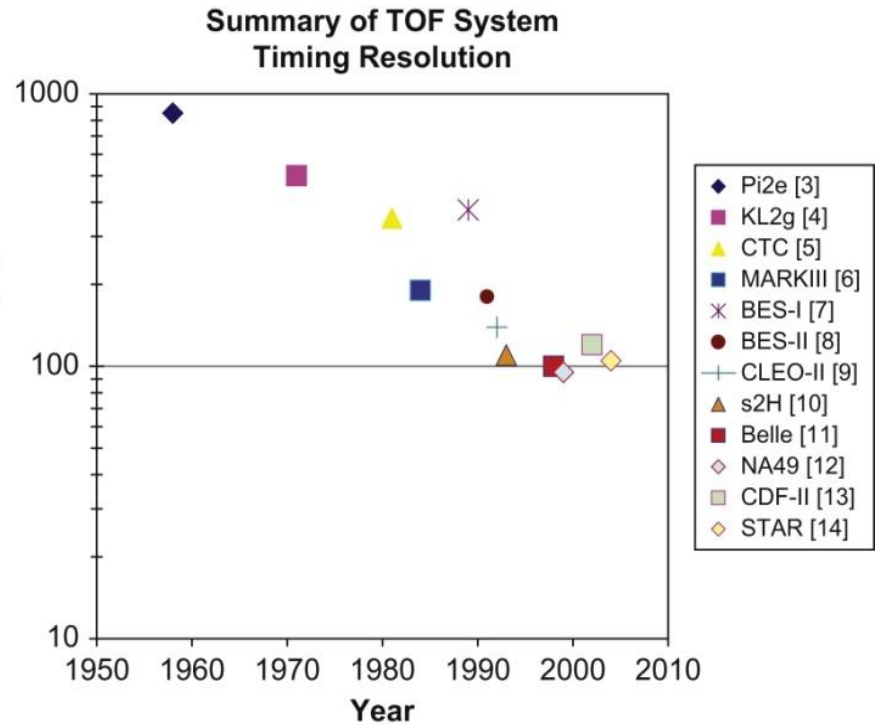
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TIME-OF-FLIGHT APPLICATIONS: HOW PRECISE CAN YOU GET?

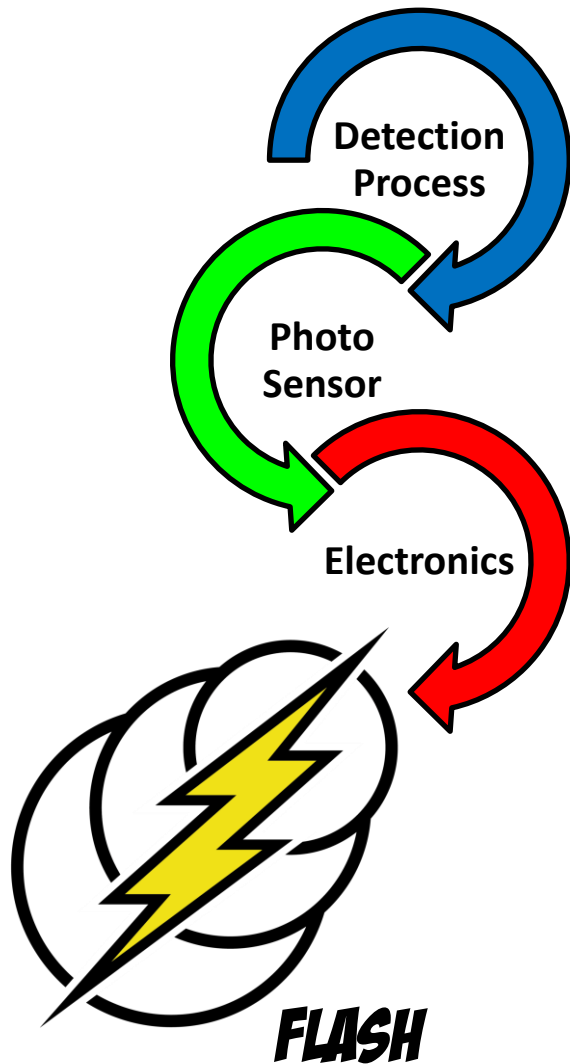


~100ps limit for large systems?



L.L.Ruckman, NIM A602 (2009), pp 438

BUILDING FLASH: LOOKING AT THE COMPONENTS



Cherenkov

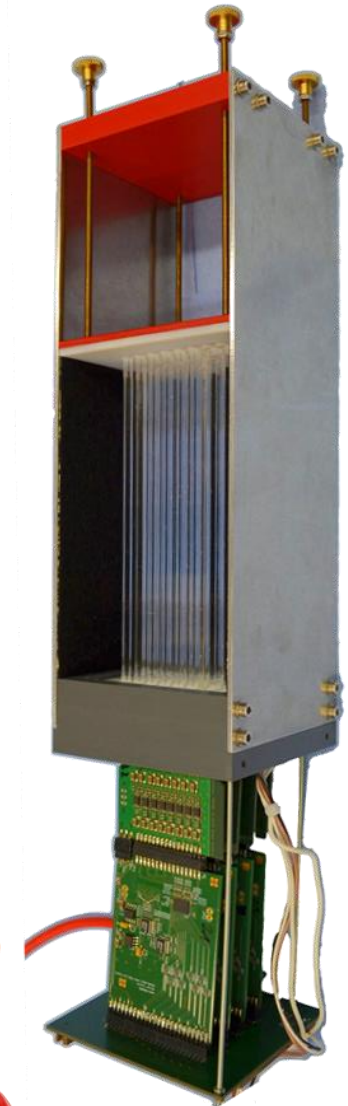
Ionization
Scintillation

Standard PMT

MCP-PMT


SiPM

**Leading Edge Discriminator
+ Time-Over-Threshold**




HOW DID FLASH PERFORM?





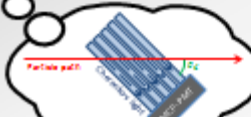
TIMING IN A FLASH

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WHAT IS A FLASH?

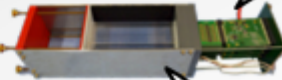
The Fast Light Acquiring Start Hodoscope is a demonstrator for a segmented start counter. It delivers precise event timing and coarse position information by taking advantage of the Cherenkov effect. Its design is based on the principles of QUARTIC.



Basic System Resolution

$$\sigma \approx \sqrt{\sigma_{opt}^2 + \sigma_{el}^2 + \sigma_{beam}^2}$$

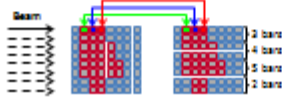
Only Time-over-Threshold (ToT) is measured. NINO-based electronics read out by TRB3 FPGA-TDCs.




Fused Silica Radiator Bars (3x3.3x140 mm³) coupled to

TESTING FLASH ...

Using the 855 MeV electron beam of the Mainz Microtron (MAMI). 25-30 detected photons per bar expected (SLITRANI simulation). Placing two FLASH units ~0.5 m apart and scan the beam across rows with different number of radiator bars.





High MCP-PMT gain and low NINO threshold favoured for timing!

