

SuperB and Sardinia

INFN-Cagliari inside SuperB collaboration

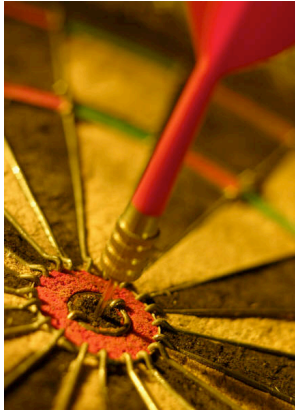




People

- * Antonio BRUNETTI UniSS & INFN CA
- * Sandro CADEDDU INFN CA
- * Alessandro CARDINI INFN CA
- * Massimo CARPINELLI UniSS & INFN CA
- * Viviana FANTI UniCA & INFN CA
- * Bruno GOLOSIO UniSS & INFN CA
- * Adriano LAI INFN CA
- * Valeria SIPALA UniSS & INFN CA
- * Piernicola OLIVA UniSS & INFN CA

- * **Synergy with DIAPIX and MC-INFN collaboration (INFN-NSC5) Catania and Laboratori Nazionali del Sud**
 - * Nunzio Randazzo INFN CT
 - * G.A.Pablo Cirrone INFN LNS
 - * Giacomo Cuttone INFN LNS



Aims:

Feasibility study, design and construction

- Luminosity Monitors
- Polarimeter measurements

Luminosity Monitors preliminary requirements:

Average luminosity (every 10ms)
Average luminosity for every bunch-crossing
(every ~minute)



Measurements with
time response of 2-4 ns

Polarimeter preliminary requirements:

Polarization near interaction point

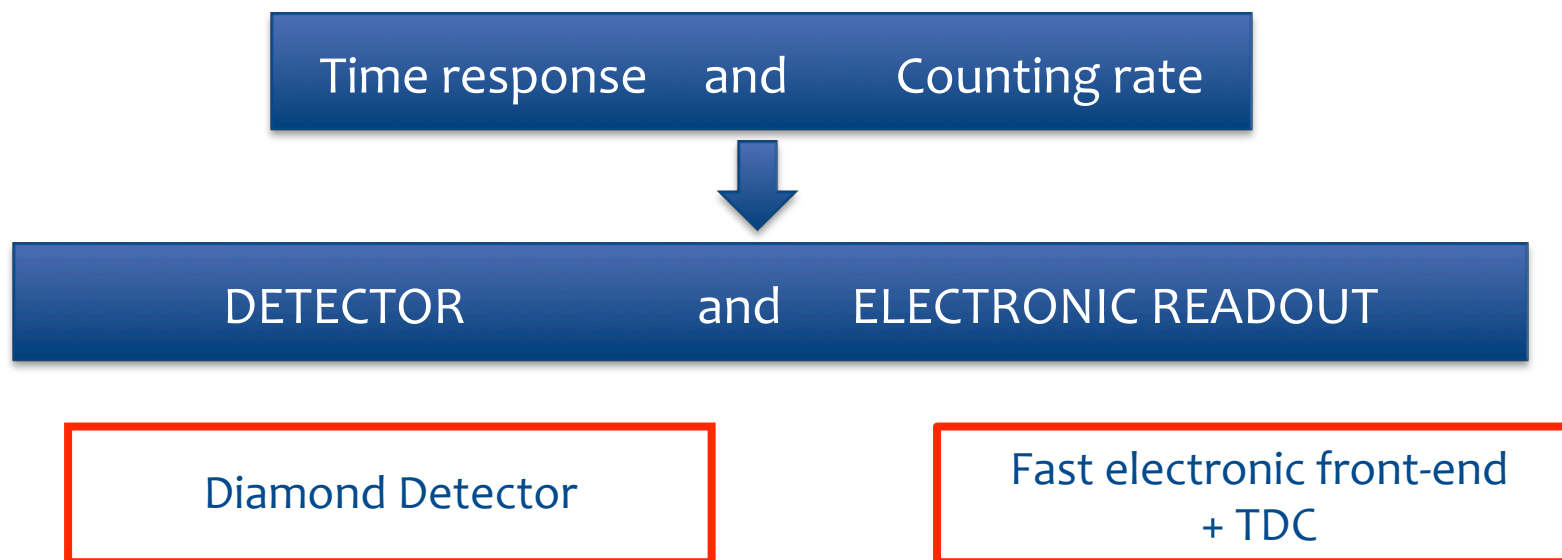


“Compton” polarimeter



Luminosity Monitor

Goal: Measurements with time response of 2-4 ns



Several detectors with same electronic readout will be studied and compared

Detector

Diamond Detector

Motivations:

- Rad-hard
- No leakage current for high dose rate
- Low photons sensitivity
- No cooling system
- Very fast response (<100ps)

Start!!!

High Purity Single Crystal Detector
Size 4.5x4.5x0.5mm
by Diamond Detector Ltd



Others Diamond Detectors

Electronic front-end

Fast Amplifier or Fast charge sensitive amplifier

Start!!!

Diamond Broadband Amplifier
CIVIDEC 2GHz
by Diamond Detector Ltd



Investigation of existing VLSI
front-end chips



Polarimeter

Goal: feasibility study of “Compton” polarimeter

Collaboration with:

- SLAC researchers
- LNF researchers
- Roma 2 INFN group

Simulation with GEANT4 and other tools

Thanks



Fast front-end

Diamond Broadband Amplifier CIVIDEC 2GHz

Parameters:

| | |
|----------------------|---|
| Type: | Ultra-fast current amplifier |
| Analog bandwidth: | 1 MHz - 2 GHz |
| Gain: | 20 dB |
| Radiation hardness: | 1 MGy |
| Input coupling: | AC coupled with 1.5 nF |
| Input impedance: | 50 Ω |
| Input protection: | IEC61000-4-2 (± 8 kV, 2 A for 1 μ s) |
| Input polarity: | Bipolar |
| Output polarity: | Inverting |
| Max. output voltage: | 1 V |
| Output impedance: | 50 Ω |
| RMS noise: | 460 μ V |

Impulse response:

| | |
|--------------|--------|
| Rise time: | 210 ps |
| Pulse width: | 280 ps |
| Fall time: | 150 ps |

