LHCb VeloPixel fast simulation

Serena Maccolini, Angelo Carbone, Tommaso Fulghesu
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serena.maccolini@cern.ch
University of Bologna and INFN Bologna

TIMESPOT sensor - simulation

- Input: MChits from full simulation with VeloPixel (VP) where the Multiple Scattering is embedded

- Deposited charge taken from MCHit. Rescaled and distributed on the sensor pixels, and digitized considering the TIMESPOT (TS) sensor:
  - trench = 5x40 mum2 in XY (vs none in VP)
  - depth = 150 mum (vs 200 mum in VP)
  - noise = 300 e- (vs 130e- in VP)
  - threshold = 1500 e- (vs 1000e- in VP)
  - No diffusion in XY
  - Alignment of the thrench with the pixel position
  - time resolution = 10,20,30 ps

Performances
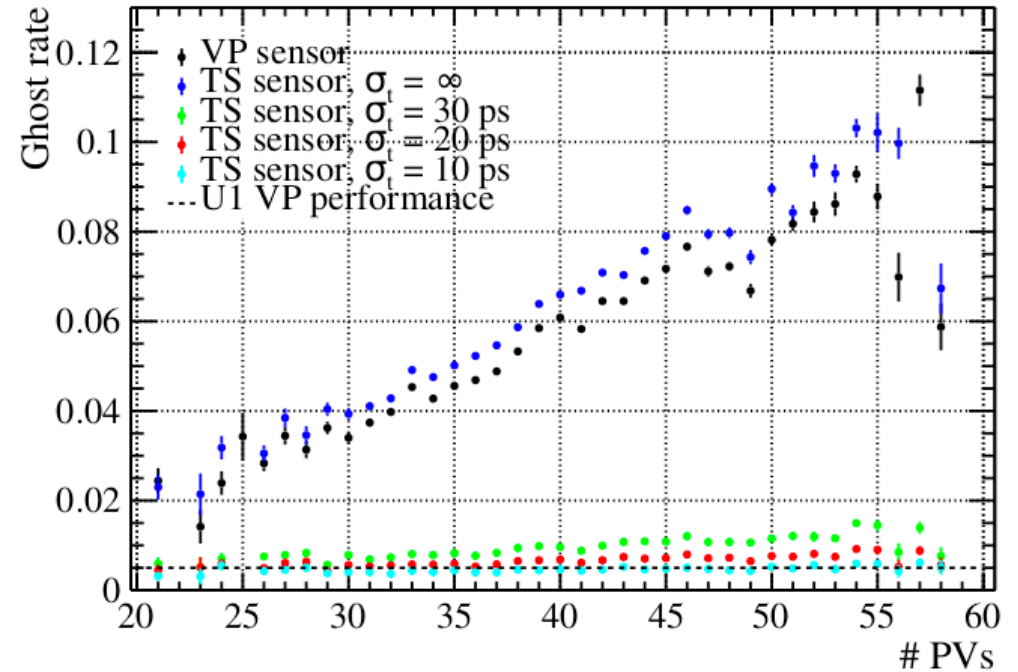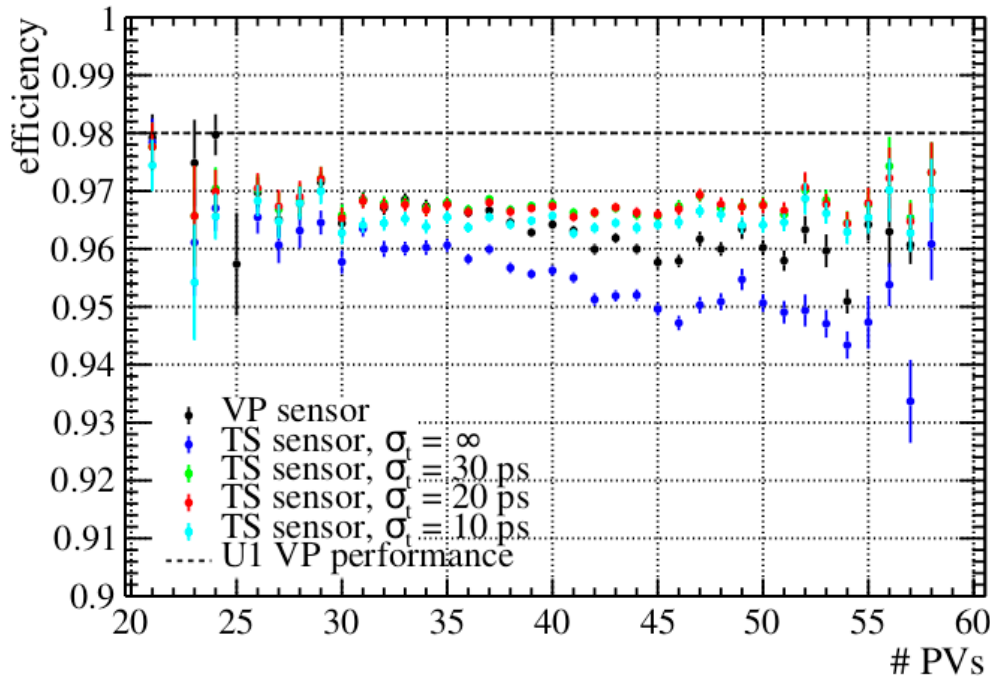
- Targeting Upgrade I VP performances
  Efficiency lower than U1
  Ghostrate comparable with U1

Upgrade II	εVELO(%)	PGHOST(%)
TIMESPOT σ_t = 10 ps	96.5	0.45
TIMESPOT σ_t = 20 ps	96.7	0.6
TIMESPOT σ_t = 30 ps	96.7	0.9
VP No Timing	96.4	5.6

Exploring different tilting angles to increase efficiency

- Considering the TS sensor with no timing