Target Parameters for Physics and Detector

Donatella Lucchesi, Massimo Casarsa, Lorenzo Sestini and Davide Zuliani
and Physics and Detector group

Parameters for Physics and Detector: $\sqrt{s} = 3$ TeV
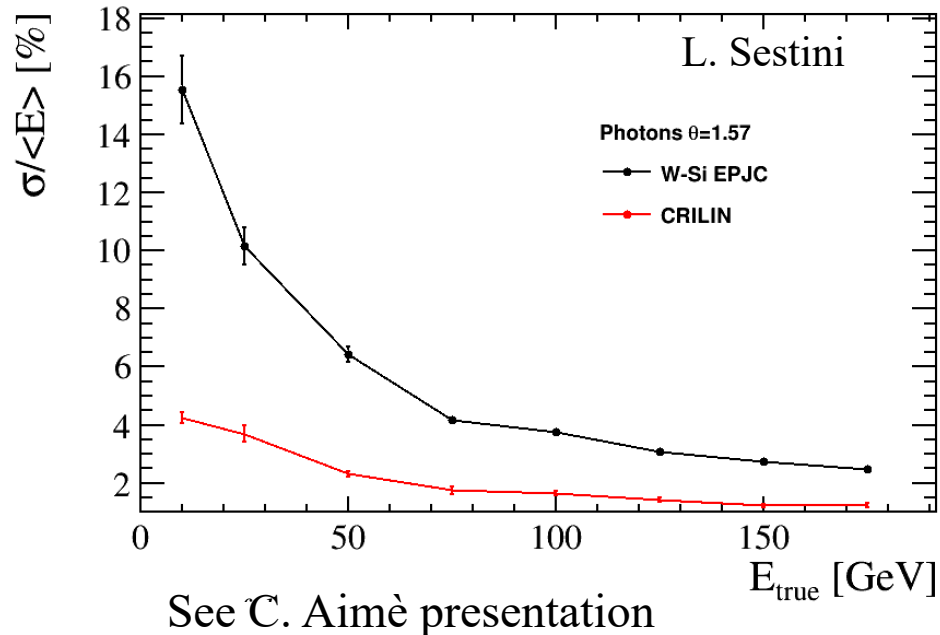
Rely on studies done by MAP at $\sqrt{s} = 1.5$ TeV for beam-induced background and nozzle, and by CLIC for recent detector technologies.
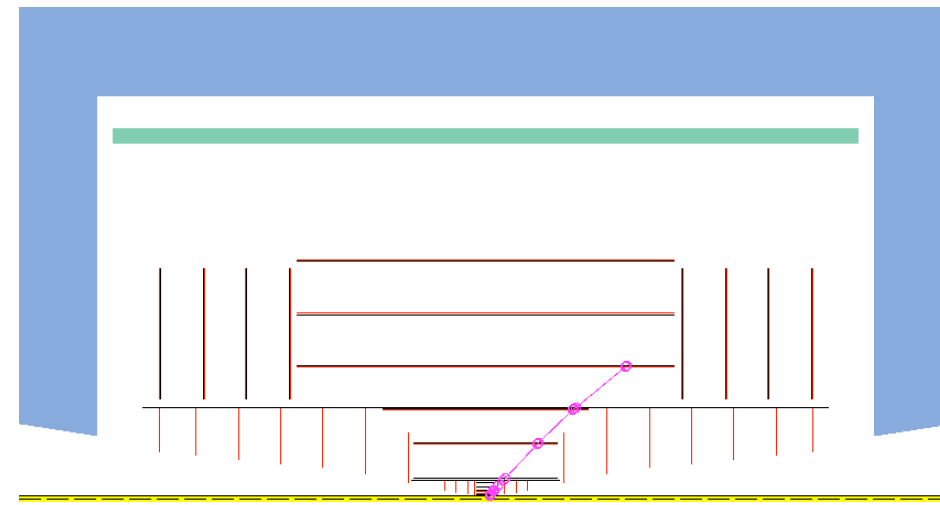
MDI to be optimized $\Rightarrow$ L. Castelli working on it, see MDI session this morning

Detector optimization in progress:

New calorimeter preliminary studies

Parametric tool to optimize tracker geometry

L. Sestini

Photons θ=1.57

— W-Si EPJC
— CRILIN

See C. Aimè presentation

See D. Zuliani presentation

Two physics cases for detector $\sqrt{s} = 10$ Te...

"Low energy", Higgs physics
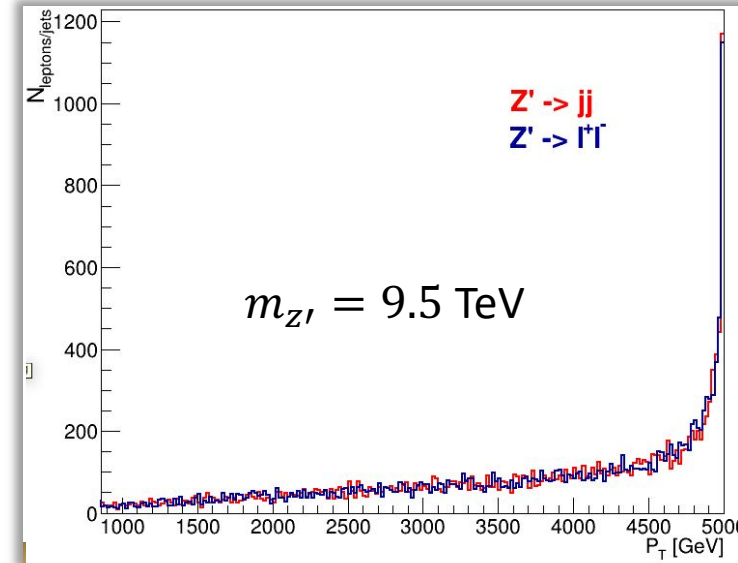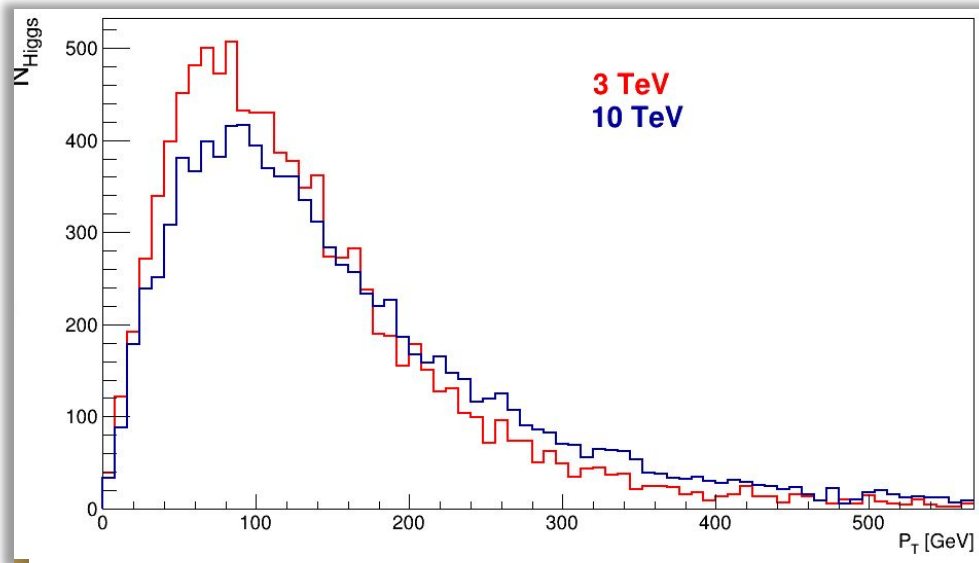Kinematics properties similar to 3 TeV

"High e...
New kin...

Need to preserve lo...

$m_{Z'} = 9.5$ TeV

# Strategy to detector parameters definition at $\sqrt{s} = 10$ TeV

Beam-induced background effects in the detector dominated by nozzle as soon as we will have it with the appropriated magnetic field we will use it.

$$\left.\frac{\Delta p_T}{p_T}\right|_{res} \approx \frac{12\,\sigma_{r\phi}\,p_T}{0.3\,B\,L^2}\sqrt{\frac{5}{N+5}}$$

Main aspects:

- Detector volume
  - Defined by the IR design L*= 6 m, possible to increase it? Should we include the final focus magnets in the detector?

- Detector magnetic field
  - CMS vs ATLAS configuration, other possibilities? P&D detector people & magnets experts meeting in September to discuss possibilities and arrive to (a) decision(s)
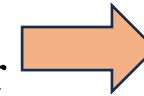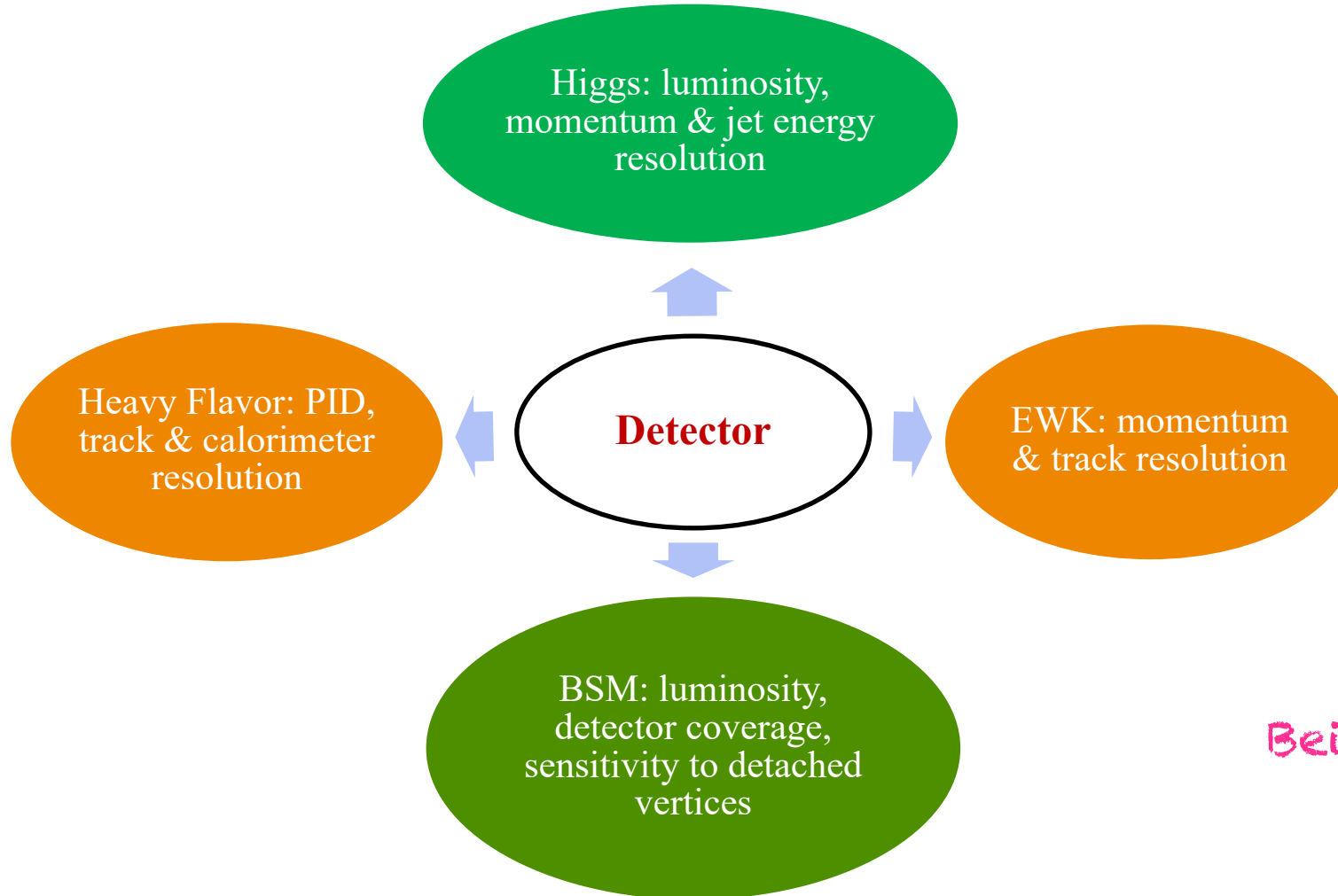
M. Casarsa presentation
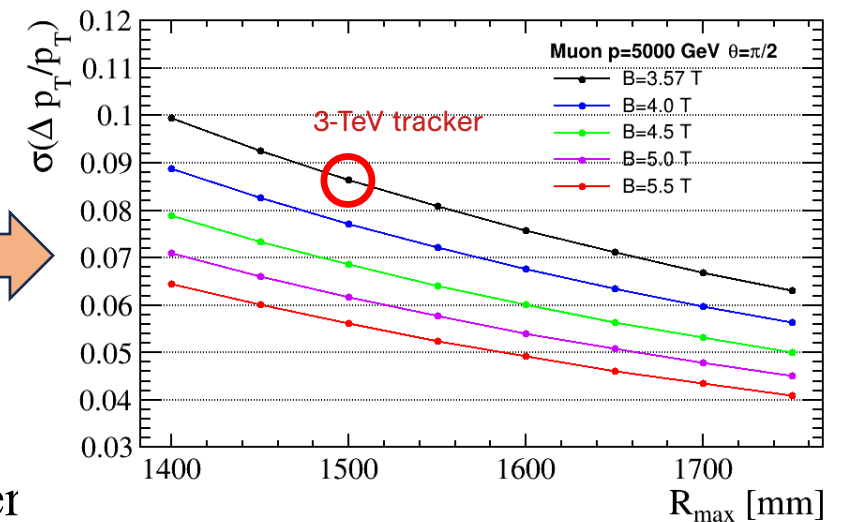
With that defined, we will be able to have detector envelope parameter

In the meantime, study and validate the BIB at 10 TeV with different magnetic field and nozzle to have an idea of occupancies

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# Minimum Desired Detector Performance: $\sqrt{s} = 10$ TeV

Higgs: luminosity, momentum & jet energy resolution

Heavy Flavor: PID, track & calorimeter resolution

Detector

EWK: momentum & track resolution

BSM: luminosity, detector coverage, sensitivity to detached vertices

Being filled...

Activities in progress for parameters definition $\sqrt{s} = 10$ TeV

Tasks to be studied:

- Tracker sub-detector
  - Parametric tool
- Calorimeter system
  - Synergies with LHC upgrades, tools for simulation available
- Muon system
  - Different technologies possible
- Forward sub-detector
  - Uncharted territory
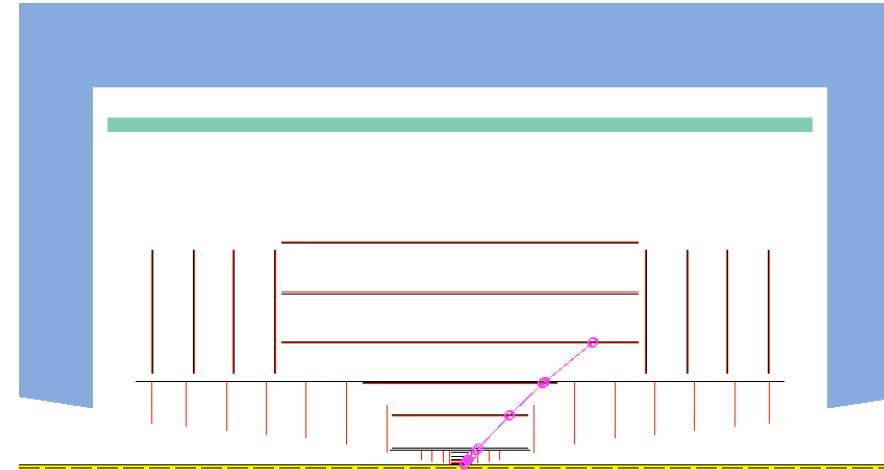
Many possibilities to contribute with new idea (old if new are not available)
Pick up your favorite item!