Detector configurations for the DGWG studies

Matteo Rama

Achille Stocchi

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Goal

* Need to define a set of reference detector configurations in FastSim to test the performance of the benchmark channels
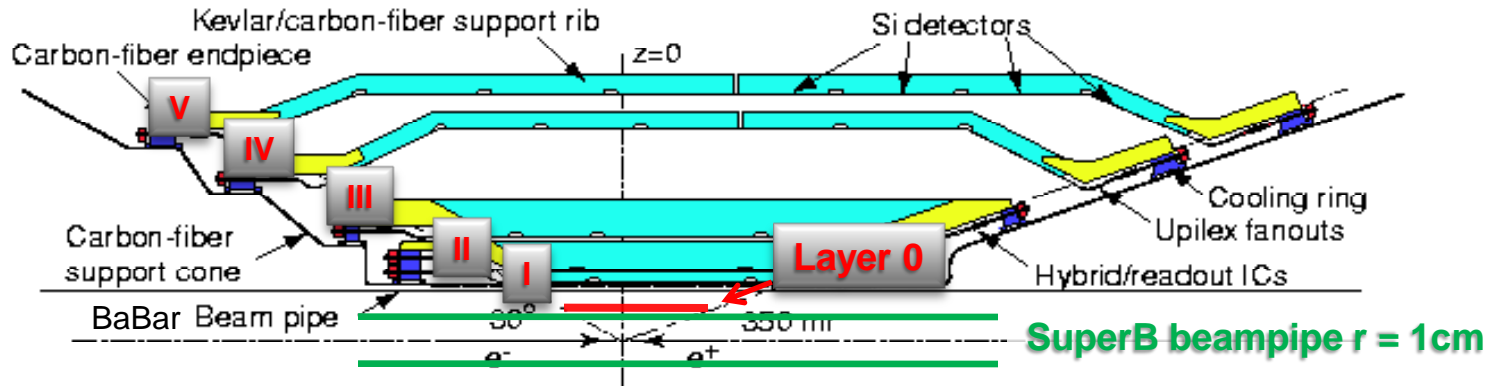
	H^+ high $\tan\beta$	Minimal FV	Non-Minimal FV (1-3)	Non-Minimal FV (2-3)	NP Z-penguins	Right-Handed currents
$\mathcal{B}(B \to X_s\gamma)$		🟩		🔴		🔴
$A_{CP}(B \to X_s\gamma)$				🟩		🔴
$\mathcal{B}(B \to \tau\nu)$	🟩 -CKM					
$\mathcal{B}(B \to X_s l^+l^-)$				🔴	🔴	🔴
$\mathcal{B}(B \to K\nu\overline{\nu})$				🔴	🟩	
$S(K_S\pi^0\gamma)$						🟩
β			🟩 -CKM			🔴

$+ \ \tau \to \mu\gamma$

🟩 Golden mode for a given scenario
🔴 Non-golden, but still sensitive to deviations from the SM
**-CKM** requires high precision on CKM parameters (obtainable with SuperB)

2

SVT

* Do we want 6 layers?

* Or can we live without layer-**II** given the presence of L0?

* The fine-tuning of the SVT internal geometry will be studied separately. Here we want to identify a limited number of basic configurations to test the benchmark channels. **The same consideration also applies to the other subsystems**
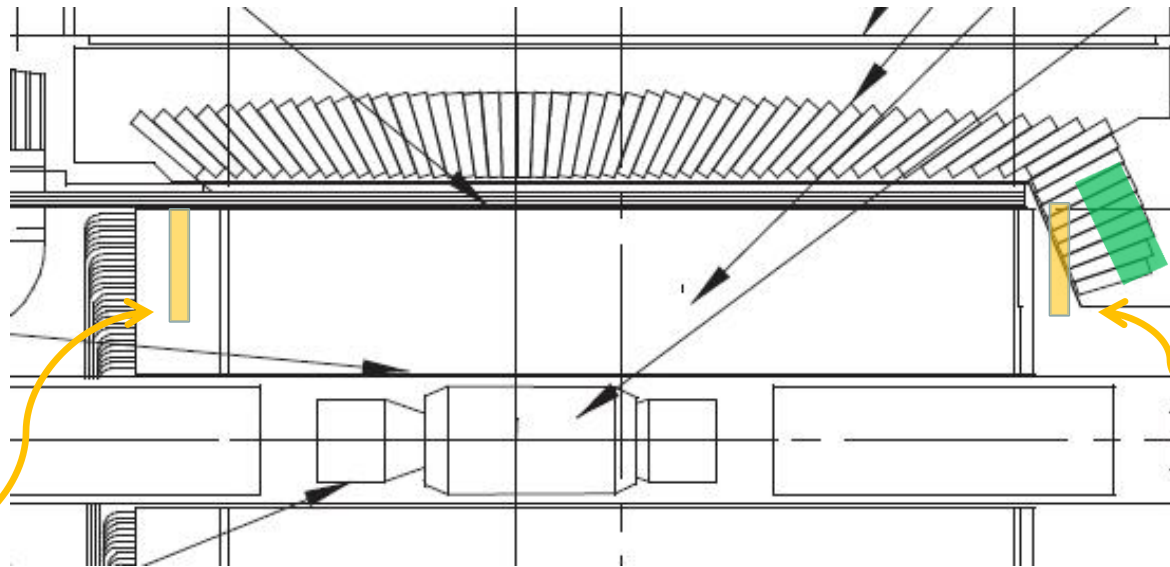
DCH

extended DCH
If LYSO fwd EMC
and NO fwd PID
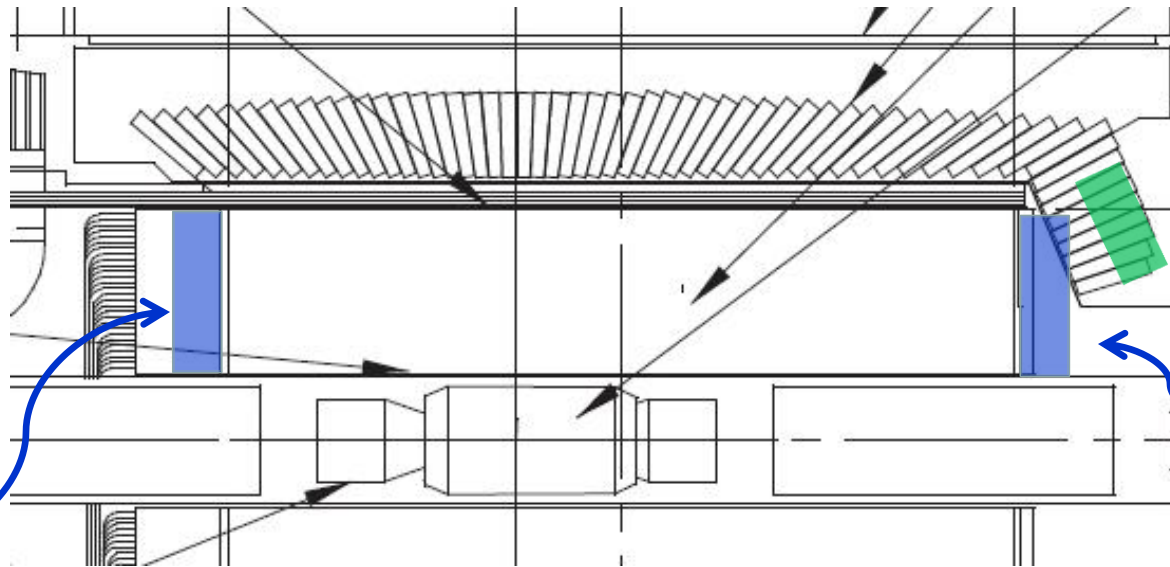
extended DCH
If NO bwd EMC/PID
and the DCH electronics
space is reduced w.r.t. Babar

4

PID

forward PID
If LYSO fwd EMC

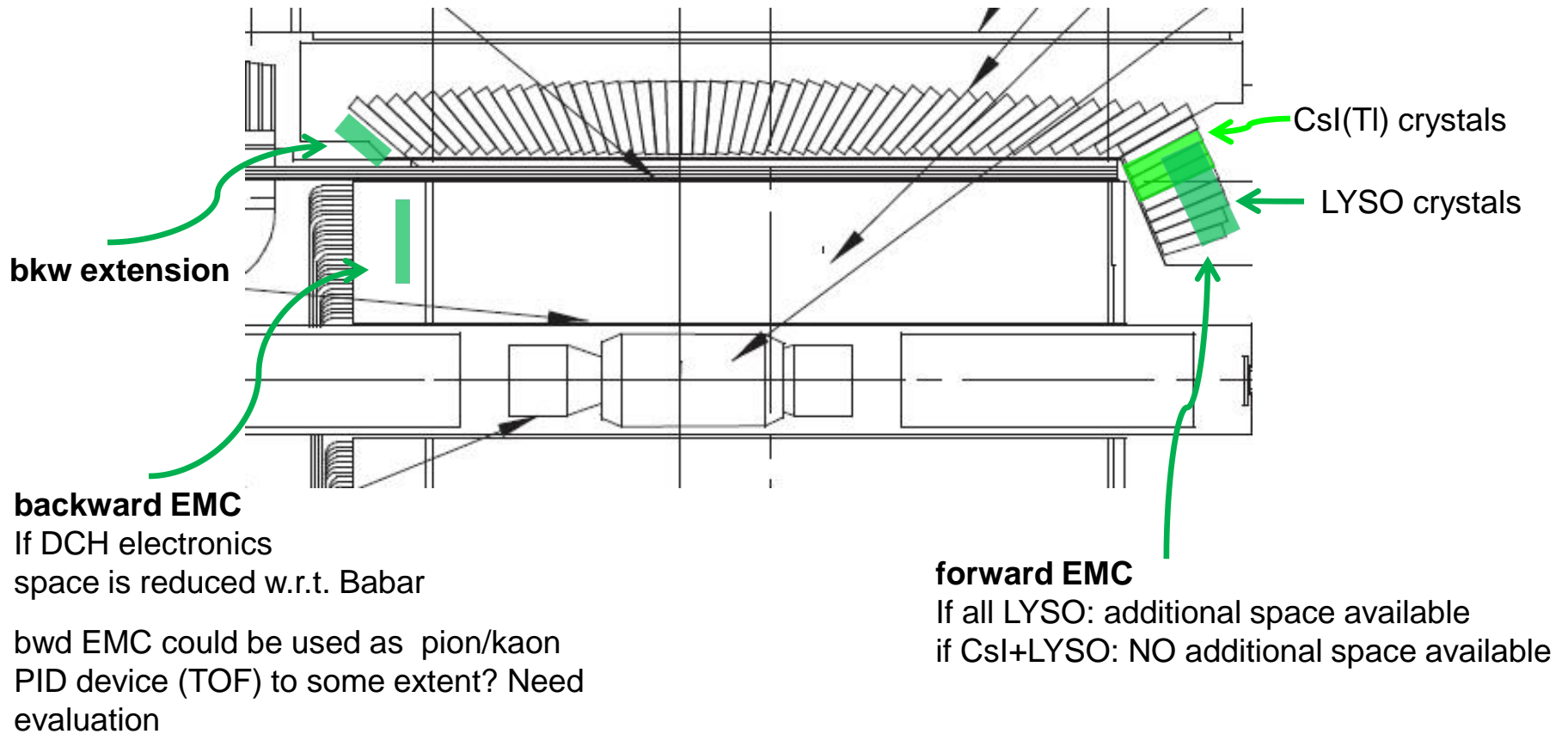**backward PID**
If NO bwd EMC
and the DCH electronics
space is reduced w.r.t. Babar

We're not considering it as a major option

EMC

CsI(Tl) crystals

LYSO crystals

bkw extension

backward EMC
If DCH electronics
space is reduced w.r.t. Babar

bwd EMC could be used as pion/kaon
PID device (TOF) to some extent? Need
evaluation

forward EMC
If all LYSO: additional space available
if CsI+LYSO: NO additional space available

Proposal

Options

* SVT: 5 layers+L0 / 4 layers+L0
* DCH: Babar size / extended forw / ext. bwd / ext. forw+bwd
* PID: DIRC / DIRC+forw PID
* EMC: forw LYSO / forw CsI+LYSO / with and without bwd EMC
* IFR: 'baseline'

	SVT	DCH	PID	EMC	IFR
0	5 layers+L0	"babar"	DIRC	fwd LYSO	baseline
1	5 layers+L0	"babar"+bwd+fwd	DIRC	fwd LYSO	baseline
2	5 layers+L0	"babar"+bwd	DIRC+fwd	fwd LYSO	baseline
3	5 layers+L0	"babar"	DIRC+fwd	fwd LYSO+bwd	baseline
4	5 layers+L0	"babar"	DIRC	fwd CsI+LYSO+bwd	baseline
5	4 layers+L0	"babar"+bwd+fwd	DIRC	fwd LYSO	baseline

Plan

* We need detailed inputs from each subsystem to finalize the set of detector configurations

* We plan to interact with each detector during the following 2 weeks to arrive at the next meeting with a refined proposal
  – which eventually should include quantitative estimates of geometry, material and detector response