


Workshop on Detector and Physics simulation at a Muon Collider

 23 Jan 2020, 15:00 → 24 Jan 2020, 17:00 Europe/Zurich

 Paolotti (Padova)

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Status of the activities on Detector and Physics simulation

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Status of the "MAP" Simulation

- The studies performed with the "MAP" framework at $\sqrt{s} = 1.5 \text{ TeV}$ are considered completed
- We have
 - ✓ Demonstrated that the BIB can be handled with proper detector;
 - ✓ Determined tracks and jets reconstruction efficiencies;
 - ✓ Evaluated b-jets tagging efficiency



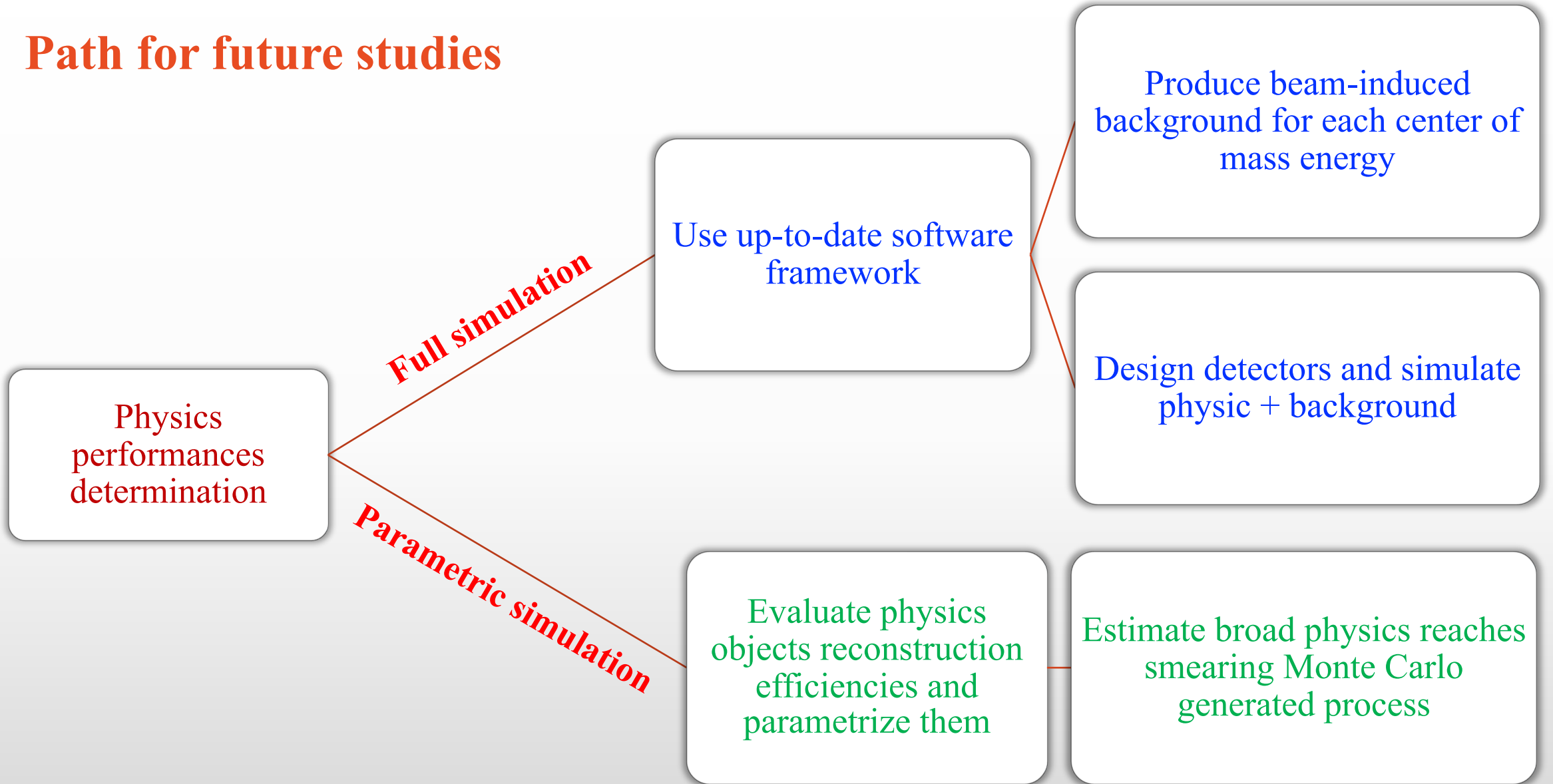
Precision physics measurement are possible at muon collider in the worse situation for the BIB

The Higgs coupling to bb has been determined

\sqrt{s} [TeV]	A [%]	ϵ [%]	\mathcal{L} [$\text{cm}^{-2}\text{s}^{-1}$]	\mathcal{L}_{int} [ab^{-1}]	σ [fb]	N	B	$\frac{\Delta\sigma}{\sigma}$ [%]	$\frac{\Delta g_{Hbb}}{g_{Hbb}}$ [%]
1.5	35	15	$1.25 \cdot 10^{34}$	0.5	203	5500	6700	2.0	1.9
3.0	37	15	$4.4 \cdot 10^{34}$	1.3	324	33000	7700	0.60	1.0
10	39	16	$2 \cdot 10^{35}$	8.0	549	270000	4400	0.20	0.91

	\sqrt{s} [TeV]	\mathcal{L}_{int} [ab^{-1}]	$\frac{\Delta g_{Hbb}}{g_{Hbb}}$ [%]
Muon Collider	1.5	0.5	1.9
	3.0	1.3	1.0
	10	8.0	0.91
CLIC	0.35	0.5	3.0
	1.4	+1.5	1.0
	3.0	+2.0	0.9

Path for future studies



This Meeting: January 23rd

16:30 → 17:30 **Introduction to New Simulation Framework: Beam Induce Background Simulation**

16:30 **Beam Induce Background Simulation in FLUKA**

Speaker: Dr Francesco Collamati (INFN Roma I (IT))

16:50 **Hands ON: FLUKA Simulation of Background Events**

17:30 → 18:50 **Introduction to New Simulation Framework: Description of Functionalities**

17:30 **New Simulation Framework: Detector and beam background**

Speaker: Nazar Bartosik (Universita e INFN Torino (IT))

17:50 **New Simulation Framework: event reconstruction**

Speaker: Laura Buonincontri (University of Padova and INFN)

18:05 **Missing pieces in the new simulation framework**

Speaker: Alessio Gianelle (Universita e INFN, Padova (IT))

18:20 **Hands ON: New Simulation Framework**

This Meeting: January 24th

09:00 → 10:50 New Simulation Framework: Tracking Studies

09:00 Description of the MAP tracking detector and results

Speaker: Massimo Casarsa (INFN, Trieste (IT))

09:20 Tracking detector studies in the new framework and next steps

Speaker: Laura Buonincontri (University of Padova and INFN)

09:40 Hands ON: Tracking Simulation and track reconstruction

10:50 → 11:10

Coffee break

11:10 → 13:00 New Simulation Framework: Jest Studies

11:10 Jet reconstruction now and new possibilities

Speaker: Lorenzo Sestini (Universita e INFN, Padova (IT))

11:30 Hands ON: Jets reconstruction

14:00 → 15:00 New Simulation Framework: b-tag studies

14:00 Current b-tag method and future possibilities

Speaker: Lorenzo Sestini (Universita e INFN, Padova (IT))

14:30 Hands ON: b-tag of jets

15:00 → 15:20 Call for new detector proposal

15:20 → 15:30 Wrap-up