Level 0 muon trigger performance:
4 cm layers distance

R. Le Gac. O. Leroy, T. da Silva*, A. Tsaregorodtsev
presented by Olivier Leroy
CPPM, Marseille / IN2P3-CNRS
*** Bolsista da CAPES-Brasilia/Brasil**

INTRODUCTION

● **Last muon meeting (LHCb week Milano, Sep'00),
L0(μ) performance was evaluated:**

- **MDST data produced with SICB v222: 10^4 B$\rightarrow\mu$X, 8.10^4 MB**
- **SICBDST v231, database 225r1**
- **MARCH'00 muon system configuration (16 cm between two layers)**
- **The muon group shows that 4 cm between two layers is mandatory when strips are used**

● **Today:**

- **Same data**
- **SICBDST v235, database 229**
- **4 cm between two sensitive layers: (x,y,z) of the raw hits are over-written in the MURW bank**
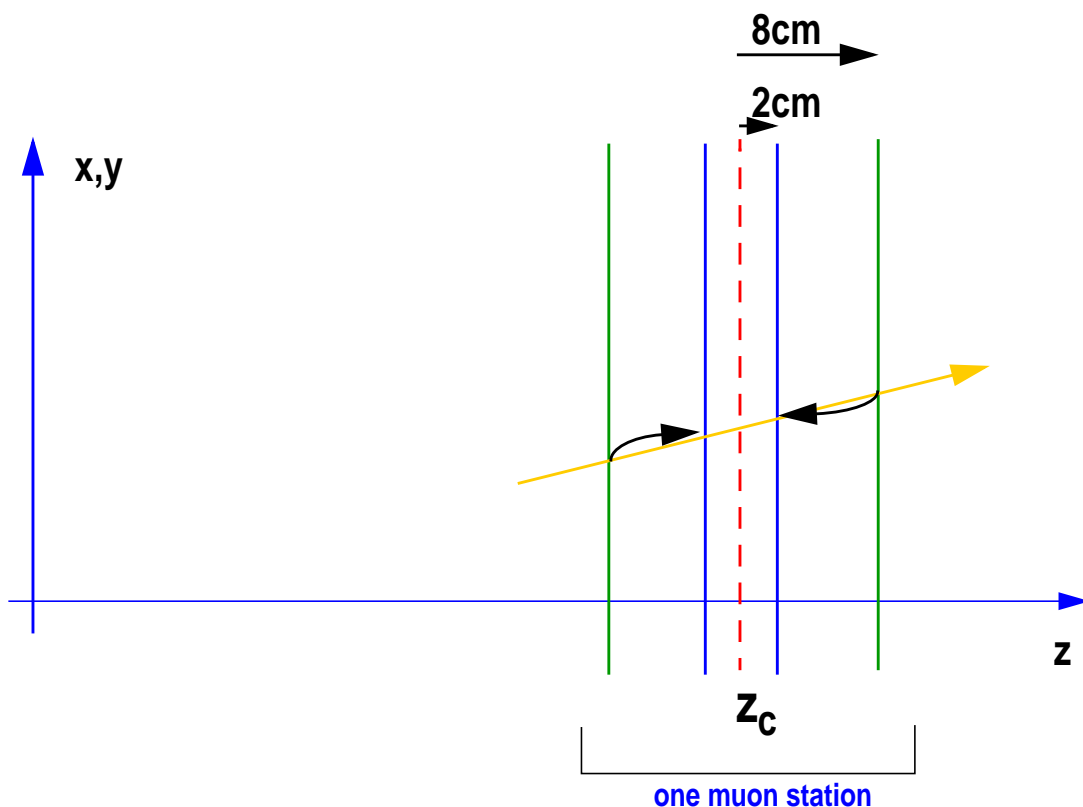
L0(μ) PERFORMANCE: DISTANCE BETWEEN 2 LAYERS=4 CM

FOI optimized for each working point

|	FOI optimized in	MB retention = 2%		MB retention = 1%	
		B$\rightarrow\mu$X Acc. [%]	PT Cut [GeV/c]	B$\rightarrow\mu$X Acc. [%]	PT Cut [GeV/c]
TP-like (16 cm)	x and y	$50.4\pm0.9\,^{+0}_{-4.8}$	$1.09\pm0.03\,^{+0.13}_{-0}$	$36.3\pm0.9\,^{+0}_{-4.3}$	$1.27\pm0.03\,^{+0}_{-0.13}$
March'00 (16 cm)	x only	$48.6\pm0.8\,^{+0}_{-7}$	$1.14\pm0.03\,^{+0.6}_{-0}$	$34.1\pm0.9\,^{+0}_{-4.8}$	$1.32\pm0.08\,^{+0.17}_{-0}$
March'00 (4 cm)	x only	$48.7\pm0.7\,^{+0}_{-0.7}$	$0.84\pm0.03\,^{+0.15}_{-0}$	$37.0\pm0.8\,^{+0}_{-4.4}$	$1.49\pm0.03\,^{+0}_{-0.13}$
March'00 (4cm)	x and y	$50.2\pm0.6\,^{+0}_{-2.1}$	$0.98\pm0.02\,^{+0.06}_{-0}$	$37.0\pm0.8\,^{+0}_{-4.4}$	$1.49\pm0.03\,^{+0}_{-0.13}$

First uncertainty comes from MC statistics.
Second uncertainties come when maximal background is applied (i.e hits $\times2$ in M_1 and $\times5$ in M_2-M_5)

– With x *AND y* optimized FOI, March'00 layout (4 cm) gives similar performance to the TP-like one. At 2% MB ret., the y-FOI are re-opened to recover the TP performance.
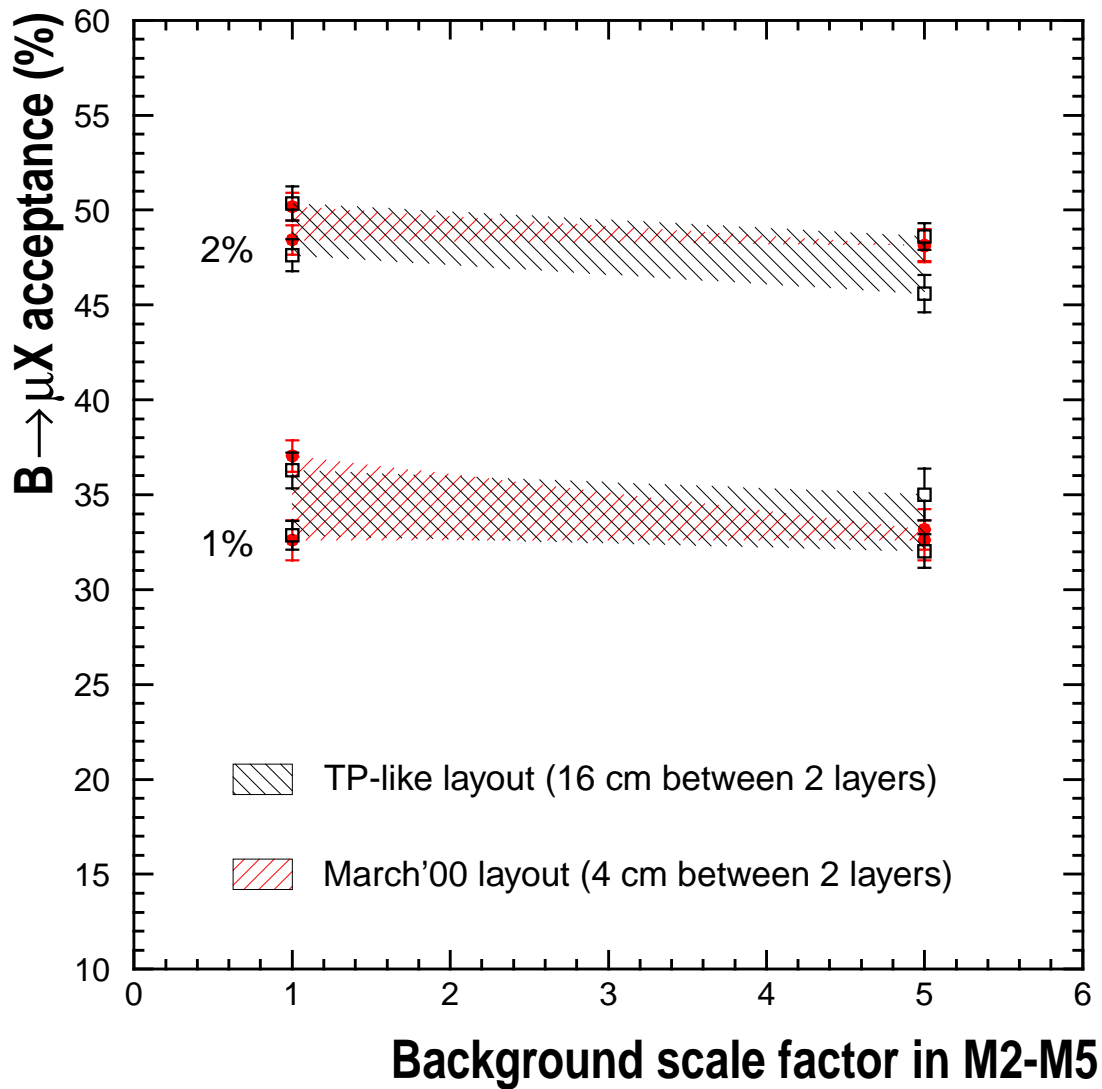
3

L0(μ) PERFORMANCE: 16 CM

LHCb note 2000-101:
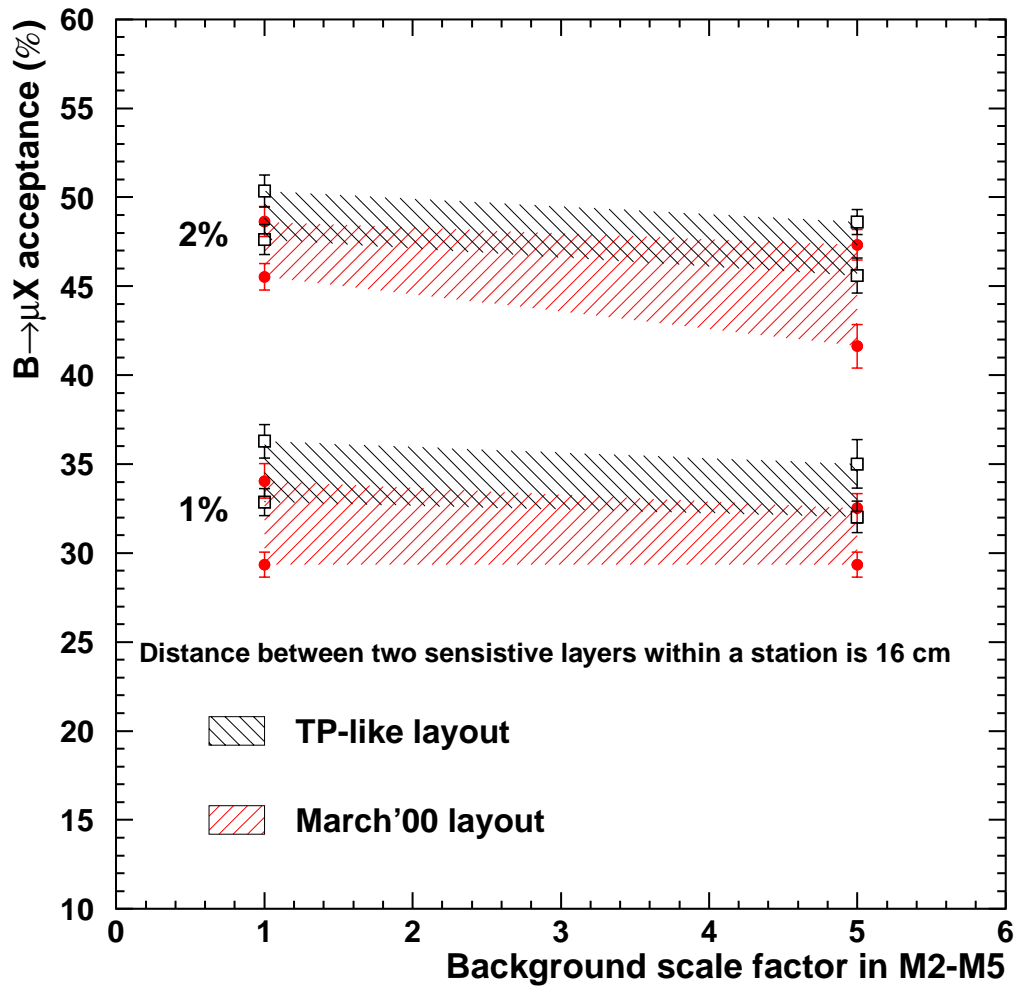
➔ March'00 (16cm) is not as good as TP-like layout

L0(μ) PERFORMANCE: 4CM

➜ **TP-like and March'00 layout give similar performance**

➜ **March'00 (4cm) layout is very robust against background at 2%MB**

CONCLUSIONS

➜ **Reducing the distance between the layers when strips are used is mandatory to get performance similar to the TP one.**

➜ **FOI have to be optimized in BOTH x AND y directions.**

➜ **No search in the y direction introduces a relative loss of 3% on B$\rightarrow\mu$X acceptance (for 2% MB retention). It has no effect at 1% MB retention.**

➜ **At 2% MB retention, the March'00 (4cm) layout is very robust against background.**

OPTIMIZED FIELDS OF INTEREST

		Nominal background								Maximal background							
		2% MB retention				1% MB retention				2% MB retention				1% MB retention			
	FOI	M1	M2	M4	M5	M1	M2	M4	M5	M1	M2	M4	M5	M1	M2	M4	M5
TP-like (16 cm)	x	5	2.5	1.5	1.5	5	2.5	1.5	1.5	5	2.5	1.5	1.5	6	2.5	0.5	0.5
	y	0.5	0.5	0.5	1.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
March'00(16cm)	x	3	3.5	1.5	1.5	2	2.5	0.5	0.5	2	2.5	1.5	1.5	1	2.5	0.5	0.5
March'00 (4cm, x)	x	3	4.5	1.5	2.5	2	3.5	1.5	1.5	3	3.5	1.5	1.5	2	1.5	0.5	1.5
March'00 (4cm)	x	3	4.5	1.5	1.5	2	3.5	1.5	1.5	3	3.5	1.5	1.5	2	1.5	0.5	0.5
	y	0.5	0.5	1.5	1.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5

L0(μ) PERFORMANCE 4CM AND NO γFOI