

# Some Notes about Bandwidths and Rates for AMBER Physic program

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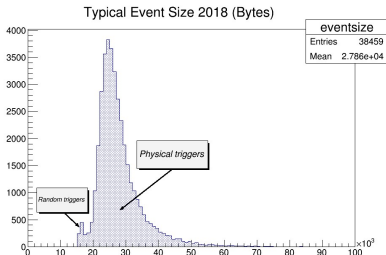


Federal Ministry  
of Education  
and Research

# Current Status I

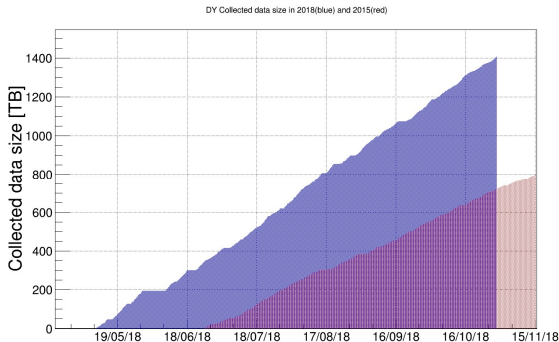
Estimated statistics on the assumption of typical event and spill sizes:

- mean event size: **27.9 kB**;
- mean number of events per spill: **~130 kEvents**;
- mean spill data size: **3.6 GB/spill**;
- Total data size: **~1.5 PB**;
- Total number of events:  **$\sim 5 \cdot 10^{10}$** ;
- Total number of spills: **~410000**.



From: COMPASS DAQ status at the end of 2018 DY run V. Frolov for COMPASS TB 06/11/2018

# Current Status II

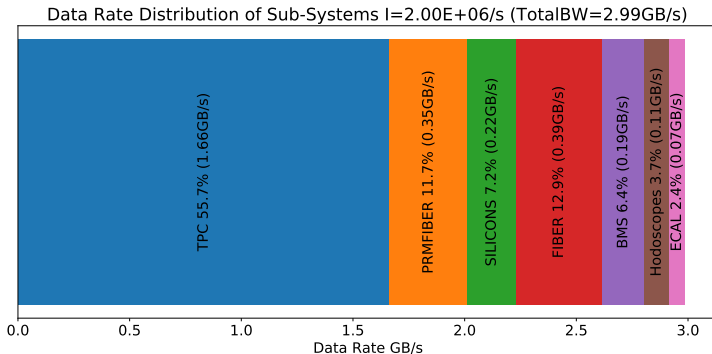


From: COMPASS DAQ status at the end of 2018 DY run V. Frolov for COMPASS TB 06/11/2018

# Setup for proton radius measurement

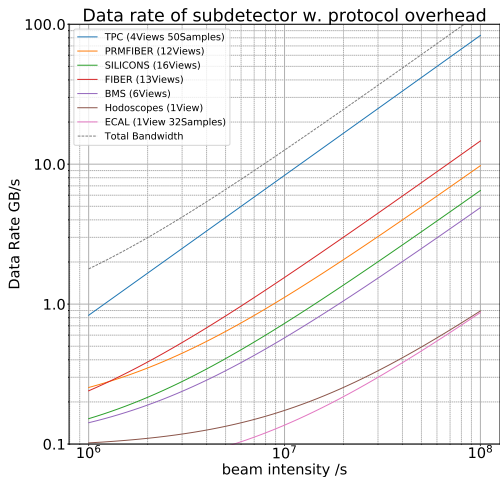
Station	Active Area /cm	Planes per det.	#Pixel per det.	#Stripes	Resolution	$\sigma_t$	Usage
BM01	6-12 x 9-23	Y		64	1.3-2.5 mm	0.3 ns	Beam Momentum Station
BM02	6-12 x 9-23	Y		64	1.3-2.5 mm	0.3 ns	Beam Momentum Station
BM03	6-12 x 9-23	Y		64	1.3-2.5 mm	0.3 ns	Beam Momentum Station
BM04	6-12 x 9-23	Y		64	1.3-2.5 mm	0.3 ns	Beam Momentum Station
BM05	12 x 16	Y		128	0.7 mm	0.5 ns	Beam Momentum Station
BM06	12 x 16	Y		128	0.4 mm	0.5 ns	Beam Momentum Station
PRMSi01	6 x 7.4	P1, P2	2.5M		23 $\mu$ m	$\leq 20$ ns	Tracking
PRMSi02	6 x 7.4	P1, P2	2.5M		23 $\mu$ m	$\leq 20$ ns	Tracking
PRMSi03	6 x 7.4	P1, P2	2.5M		23 $\mu$ m	$\leq 20$ ns	Tracking
PRMSi04	6 x 7.4	P1, P2	2.5M		23 $\mu$ m	$\leq 20$ ns	Tracking
PRMSciFi01	5 x 5	X1, X2, Y1, Y2		1000	100 $\mu$ m	$\leq 0.6$ ns	Timing/Kink-Trigger/Lumi
PRMSciFi02	5 x 5	X1, X2, Y1, Y2		1000	100 $\mu$ m	$\leq 0.6$ ns	Timing/Kink-Trigger/Lumi
PRMSciFi03	5 x 5	X1, X2, Y1, Y2		1000	100 $\mu$ m	$\leq 0.6$ ns	Timing/Kink-Trigger
TPC	R=60	R1, R2, R3, R4	128 <sub>(pads)</sub>		1 cm	64 $\mu$ s	Recoil Proton
SciFi01	3.9 x 3.9	X, Y		192	130 $\mu$ m	0.4 ns	BeamMonitoring/Lumi
SciFi05	8.4 x 8.4	X, Y		320	170 $\mu$ m	0.4 ns	Tracking SAS
SciFi55	6.8 x 12.3	U, V		192		0.4 ns	Tracking SAS
SciFi06	10.0 x 10.0	X, Y, U		462	210 $\mu$ m	0.4 ns	Tracking SAS
SciFi07	10.0 x 10.0	X, Y		286	210 $\mu$ m	0.4 ns	Tracking SAS
SciFi08	12.3 x 12.3	X, Y		352	210 $\mu$ m	0.4 ns	Tracking SAS
HI5	35.3 x 51	X		64	0.6cm	0.4,ns	$\mu$ -Identification
ECAL	10x10(cells)	1	100		cell size	$\approx 1$ ns	Photon detection
Total:			9830628	5380			

# Data Rate Distribution across Detector Systems



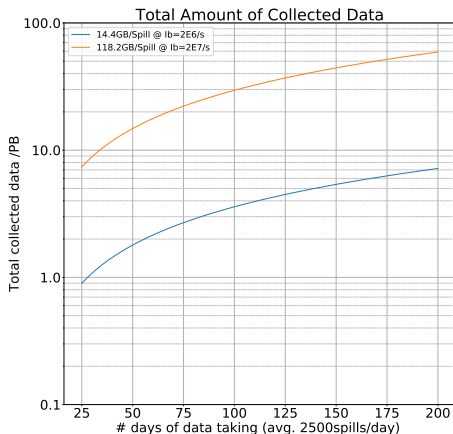
Very conservative estimate of data rates including protocol overhead and assuming that all detectors see the full beam. TPC is not self triggered in the scheme but also have a continuous read-out (with zero suppression on detector side).

# Estimated Data Rate of different Detector Systems



Calculations include simple noise estimations of detectors systems and protocol overhead.

# Total Amount of Collected Data PRM



2E6 : We write the whole un-triggered data stream to disk to have an unbiased sample.

2E7 : We need some kind of data reduction to made the amount of data handable.

## Vetoless read-out for DY 2018

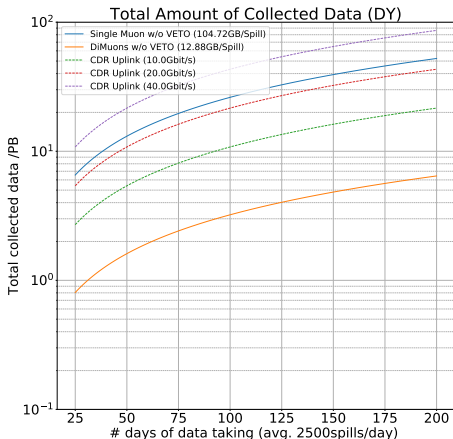
Rates from VETO dead time tests in 2018 ( $\approx 3E7/s$ )

Trigger	w. Veto	w/o. Veto
LAS	742000	1600000
OT	170000	1200000
MT	183000	1400000
LASLAS	110000	250000
OLAS	7000	160000
MLAS	3300	50000

Sum of di-muon triggers without Veto: 460k/spill



# Estimate of Total Amount of Collected Data DY



The numbers coming from our veto less tests in 2018. The assumption is that we implement the same Trigger scheme like it was in 2018 in FPGA. The rates are multiplied by the average Event Size ( $\approx 29$  KByte) of 2018.