

## Notes on my current understanding of the far-forward and far-backward detectors:

1. Data Rate Assumption governed by low acceptance for FF, but not for FB (Athena)

B0	.25 tracks per event (125KHz max)
RP	5-10KHz (tracks + beam gas)
OFFM	5-10KHz (tracks + beam gas)
ZDC	5-10KHz (tracks + beam gas)
Far Backward	<p>Bremsstrahlung gives signal every bunch crossing. Estimate from Athena was 60-80 Gbps data to DAQ, but this to be histogrammed, not read out in full. Detectors may be larger now?</p> <p>Full readout only for events selected as having collisions in central detector.</p>

# Far Forward and Far Backward Channel counts

## Athena:

B0Silicon <a href="#">[2]</a> <a href="#">[3]</a>	400M	MAPS*
B0preshower	260k	AC-LGAD readout with ALTIROC ASIC
RP	550k	AC-LGAD readout with ALTIROC ASIC
OffM	320k	AC-LGAD readout with ALTIROC ASIC
ffiZDCSi	213k	Silicon strip detectors - DC-LGADs
ffiSDCSiFi	576	PMTs
ZDCSiPb	500k	If silicon used, less if silicon fibers used.
ZDCScint	36-72	PMTs; depends on whether two sections are read-out independently.
TOF	332k	AC-LGAD
Luminosity monitoring and Low Q tagging	4000	6 PMT based calorimeters *

Note that Far Forward group is asked me about form factors for electronics and cooling and how they might interact with the requirements of B0 (limited space and accessibility) and RP/OFFm (special beam issues). For the readout technology they are currently watching the eRD groups and other detectors.

## Detector 1:

Detector	Description	Total Channels	Notes
B0			Unclear: 3 versions (Area is 20x20cm)
	(A) 4 x 150k AC-LGAD (plus calorimeter?)	600k 100	All AC-LGAD (as per ECCE)
	(B) 3 MAPS layers 1 AC-LGAD layer (plus add 2 AC-LGAD?)	300M pixel 150k 300k	Assumes 3x20x20 cm @ 20x20 um pitch. ~300 sensors? (as per Athena) Assumes 500x500um pitch
2 RP & 2 OFFm	4 x 500k AC-LGAD layers	8M	4 detectors of 2M channels each
ZDC	Crystal 32 x 3600 ch silicon pad 4 x 40,000 ch silicon pixel 2 boxes of scintillator	400 11520 160k 72	APD if sufficient radiation hardness HGCROC as per ALIC FoCal-E pad layers Need discussion? APD (15 layers read together?)
Low-Q Tagger 1	40x40cm <sup>2</sup> (or 15x15cm <sup>2</sup> )	1.3M	2 layers (high rates from bremsstrahlung → histogram + triggered readout?)
Low-Q Tagger 2	30x20cm <sup>2</sup> (or 15x15cm <sup>2</sup> )	480k	2 layers (histogram + triggered readout?)
2 Calorimeters	400 + 300 channels	700	2 detects (histogram + triggered readout?)