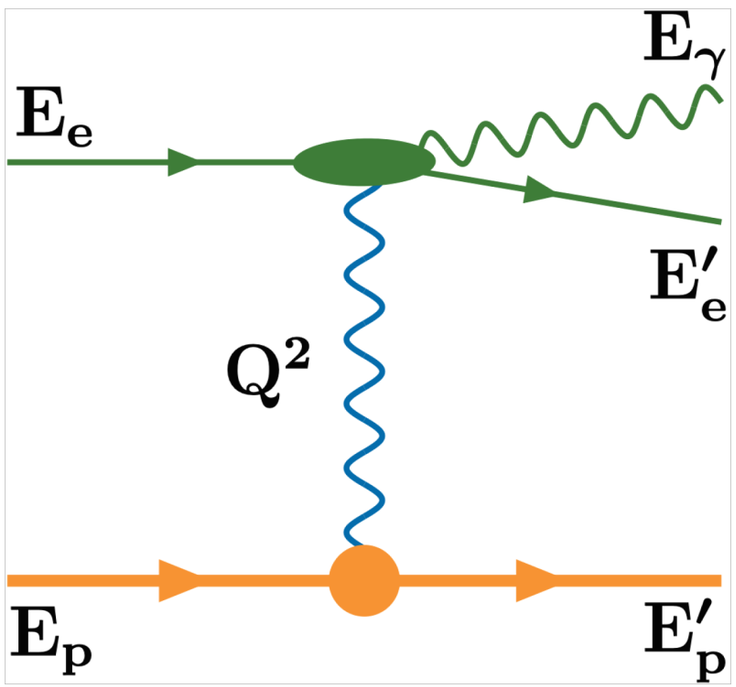
FarBackward DAQ discussion
(input/starting point a la Athena)



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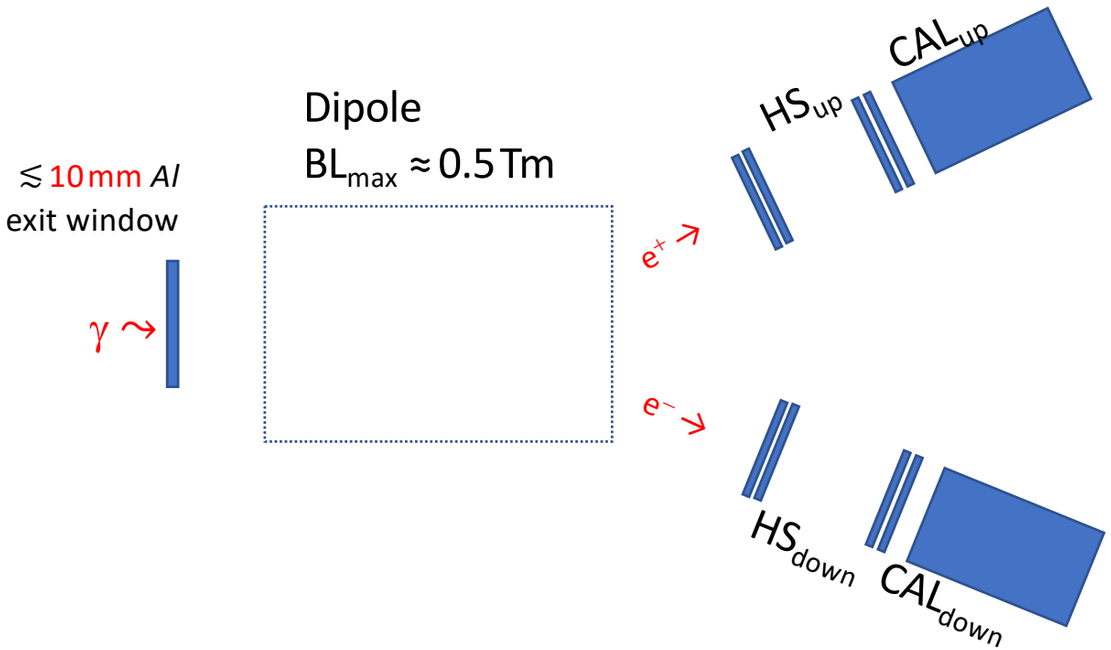
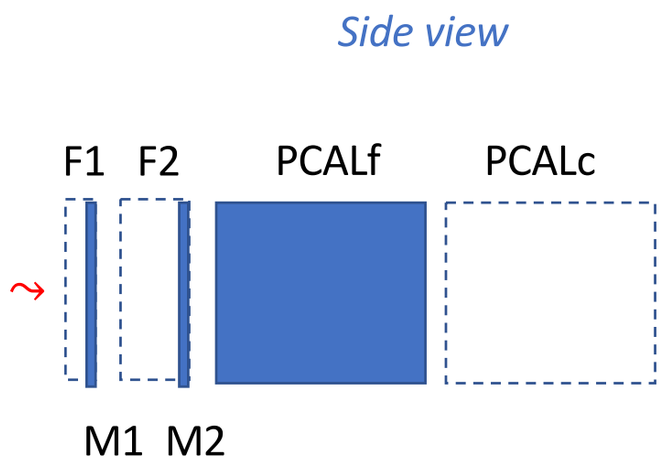
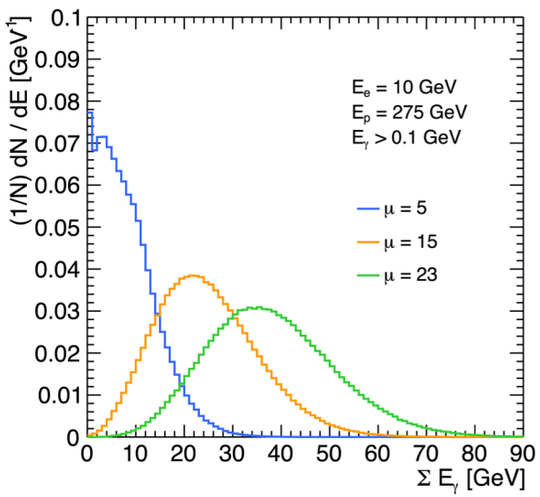
Three luminosity methods

Three largely complementary **bremsstrahlung** measurements:

1. *Reference* measurement – photon counting with a (movable) calorimeter PCALc, only at *low L* – but with the bremsstrahlung event rates up to 100 MHz
2. Photon conversion **counting** using $CAL_{up/down}$ + $HS_{up/down}$ (outside SR fan) – with the event rates above 100 MHz for *eAu* collisions
3. Photon **energy flow**, or $\langle E_{PCALf} \rangle$, using a movable calorimeter PCALf, with SR filters/monitors in front







FarBackward: $CAL_{up/down}$ + PCALc + PCALf

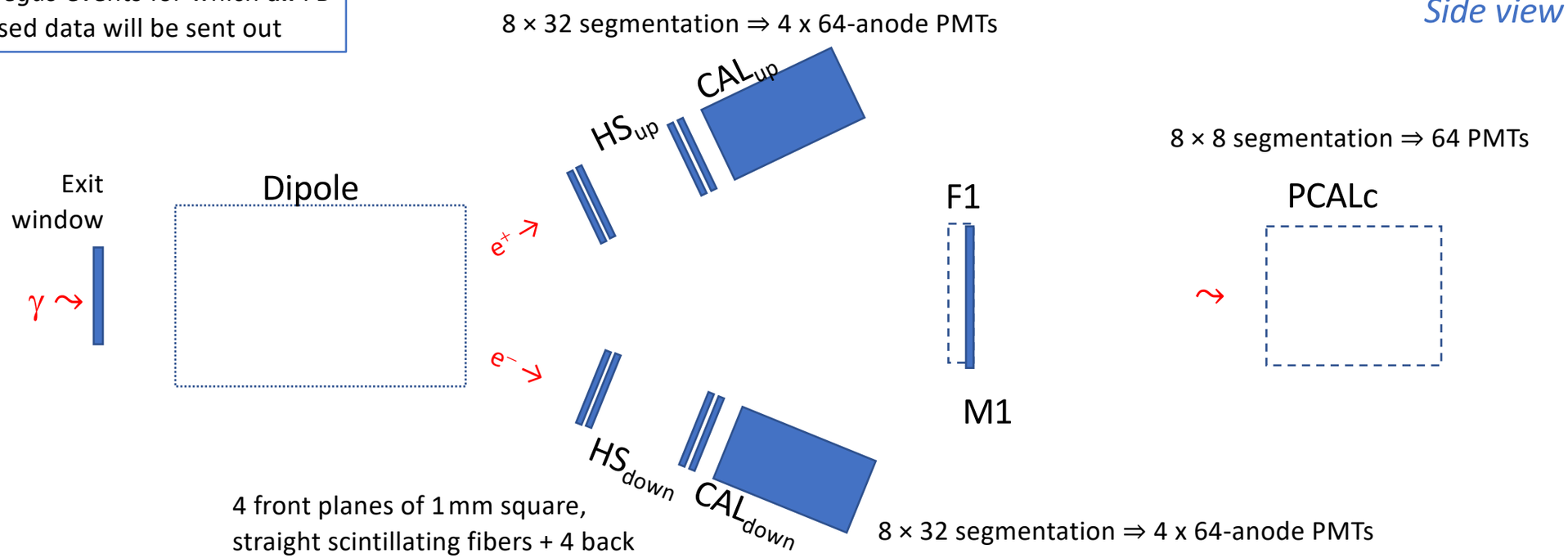
$CAL_{up/down}$ and $HS_{up/down}$ *ep* event rate will reach 10 MHz – **all zero-suppressed data** will be sent to the central DAQ system to build full spectrometer events, with the data stream of about 2 × (80 b + 120 b) × 10 MHz = 4 Gbps (it becomes about 60 Gbps for *eAu*)

For PCALc the maximal rates will be similar, so its (unsuppressed) data stream = 64 × 10 b × 10 MHz = 6.4 Gbps

"By construction" PCALf and M1/M2 see (multiple) events every bunch-crossing – except for the FB calibration events**, **all** its data needs to be processed = 80 × 10 b × 100 MHz = 80 Gbps , but only **very large number of histograms** will be sent out.

) mostly small rate *egas* events for which **all FB detectors' unsuppressed data will be sent out

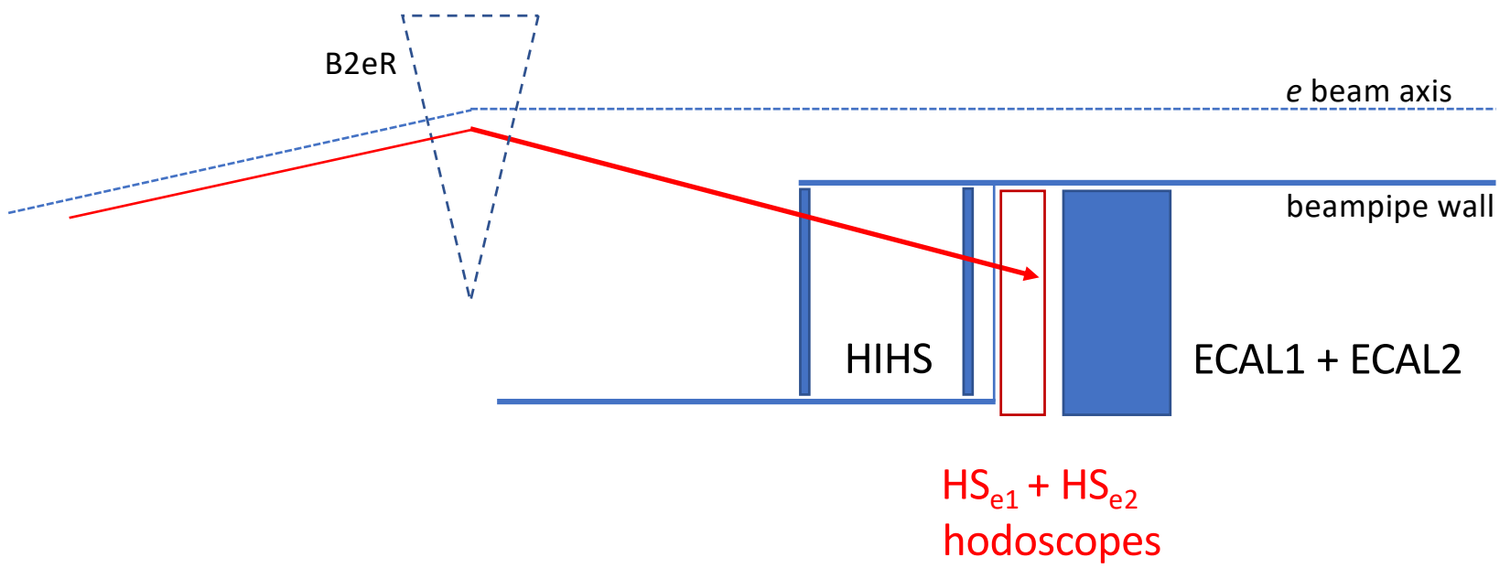
Side view



FarBackward: Bremsstrahlung electrons & photoproduction tagging

Electron calorimeters $ECAL_{1/2}$ and HS_{e1} + HS_{e2} will see ***ep* event rates** even beyond 100 MHz at the nominal luminosity, what results in a huge (bremsstrahlung) data flow well above 2 × (80 b + 120 b) × 100 MHz = 40 Gbps.

Bottom-line: a total throughput of **at least 120 Gbps is needed for the FB detectors** (with a small fraction used for sending out highly processed luminosity data) – and assuming the SR background can be neglected.

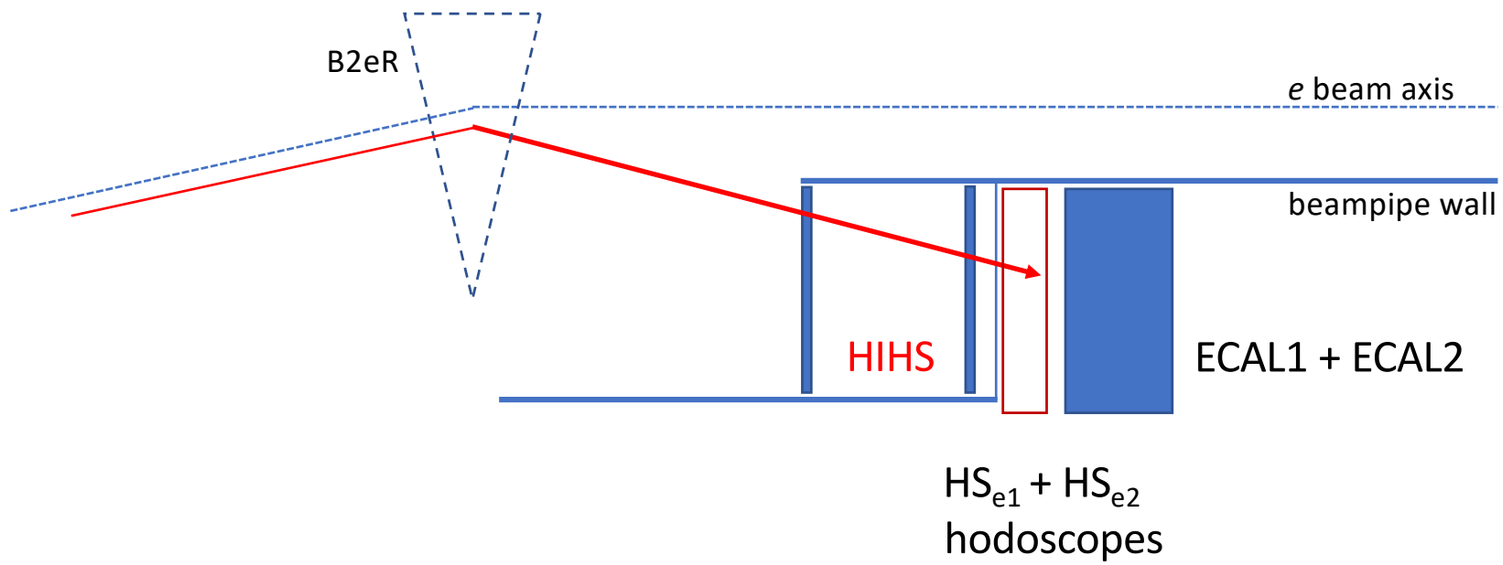


Top view

FarBackward: ePIC update

In case HIHS (= two pixel stations in vacuum) is the nominal choice, one definitely needs updating.
Electron calorimeters $ECAL_{1/2}$ and HIHS will see ***ep* event rates** even beyond 100 MHz at the nominal luminosity, what results in a huge (bremsstrahlung) data flow well above 2 × (80 b + 120 b) × 100 MHz = **40 Gbps??**

Bottom-line: a total throughput of **at least 200 Gbps [??] is needed for the FB detectors** (with a small fraction used for sending out highly processed luminosity data) – and ~~assuming~~ the **SR background** ~~can~~ has to be ~~neglected~~ included!



Top view

FarBackward: ePIC update – next steps

1. Update event sizes

2. Provide first list of online LUMI_histograms