BCM1F as Luminosity Monitor

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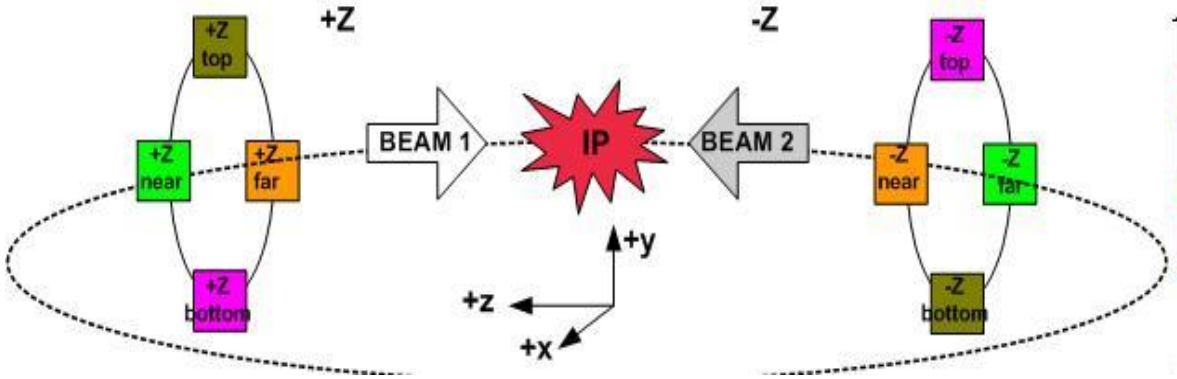
Outline

- Scaler Measurements
- Comparison of Scaler Measurements and HF Lumi
- First Calibration
- Checking the Scale Factor
- Conclusion

Scaler Measurements

- Count rates: they provide CMS background 1 to LHC
- Coincidences of collision products for Luminosity estimation



Coincidences in LUT	BCM1F channels
A	-Z top & +Z bottom
B	+Z top & -Z bottom
C	+Z near & -Z far
D	-Z near & +Z far

To check possibility of using BCM1F as a Luminosity Monitor we cross check with HF Lumi

Comparison of Scaler Measurements with HF Lumi

- BCM1F counts 4 back-to-back coincidences
- sum up the coincidences and compare with HF Luminosity
- multiply the HF Luminosity with a scale factor
- Make a calibration of BCM1F to use BCM1F as a Luminosity Monitor

- In addition, we plot the Scaler count rate of +Z and -Z diamonds
- Sum up channels in +Z plane and –Z plane
- Multiply the count rates with a scale factor

Notes:

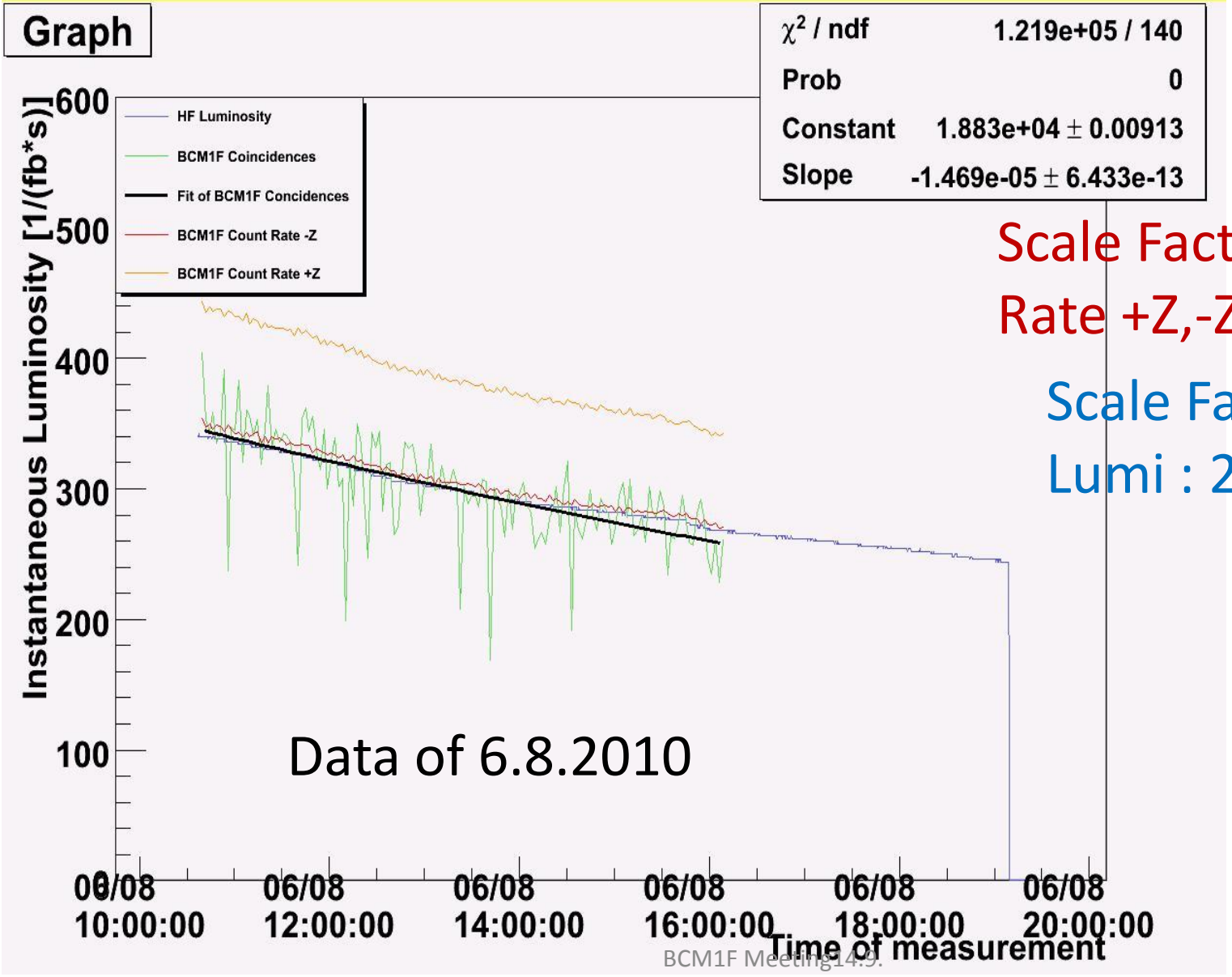
- We use always the same calibration for different data/runs:

  Scale factor for HF Lumi: 220

  Scale Factor for count rate: 1/ 165

- Different runs have the same number of colliding bunches
- HF takes GMT and BCM1F takes local time (2 hrs difference) -> convert HF time to local time

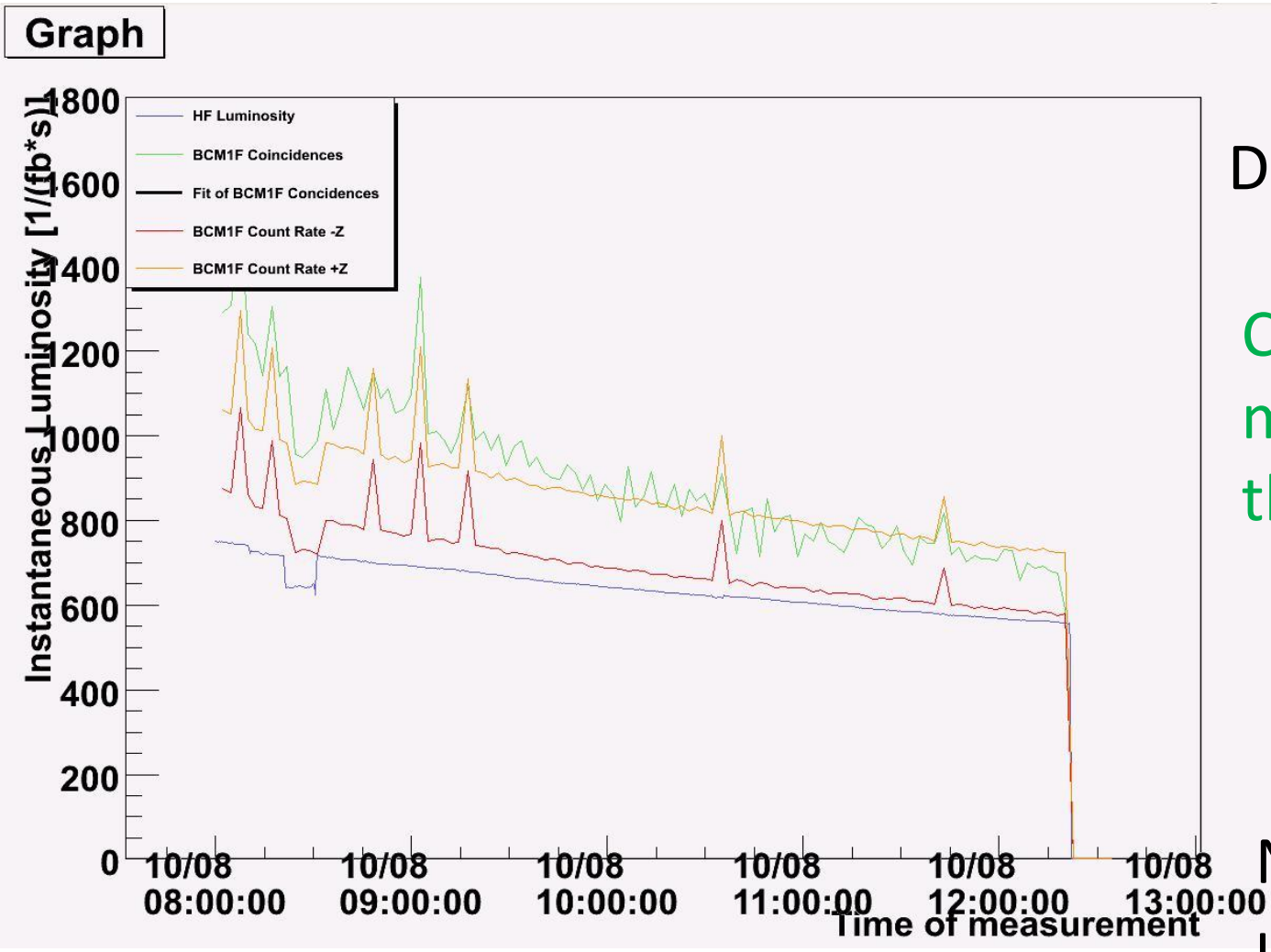
First Calibration



Scale Factor for Count Rate +Z,-Z: 1/165

Scale Factor for HF Lumi : 220

Checking the Scale Factor

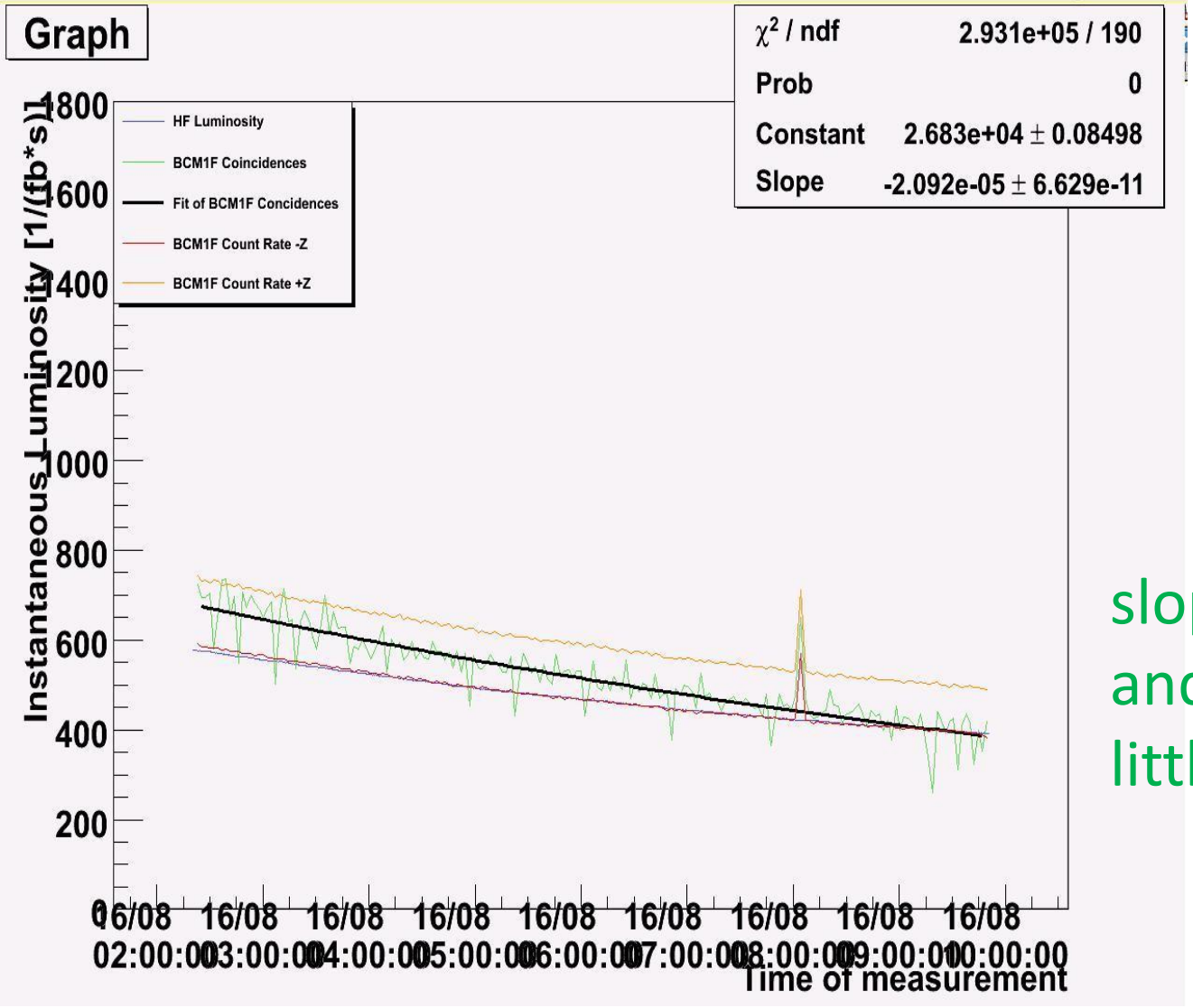


Data of 10.8.2010

Coincidences are much higher than HF Lumi

Need more understanding of coincidences

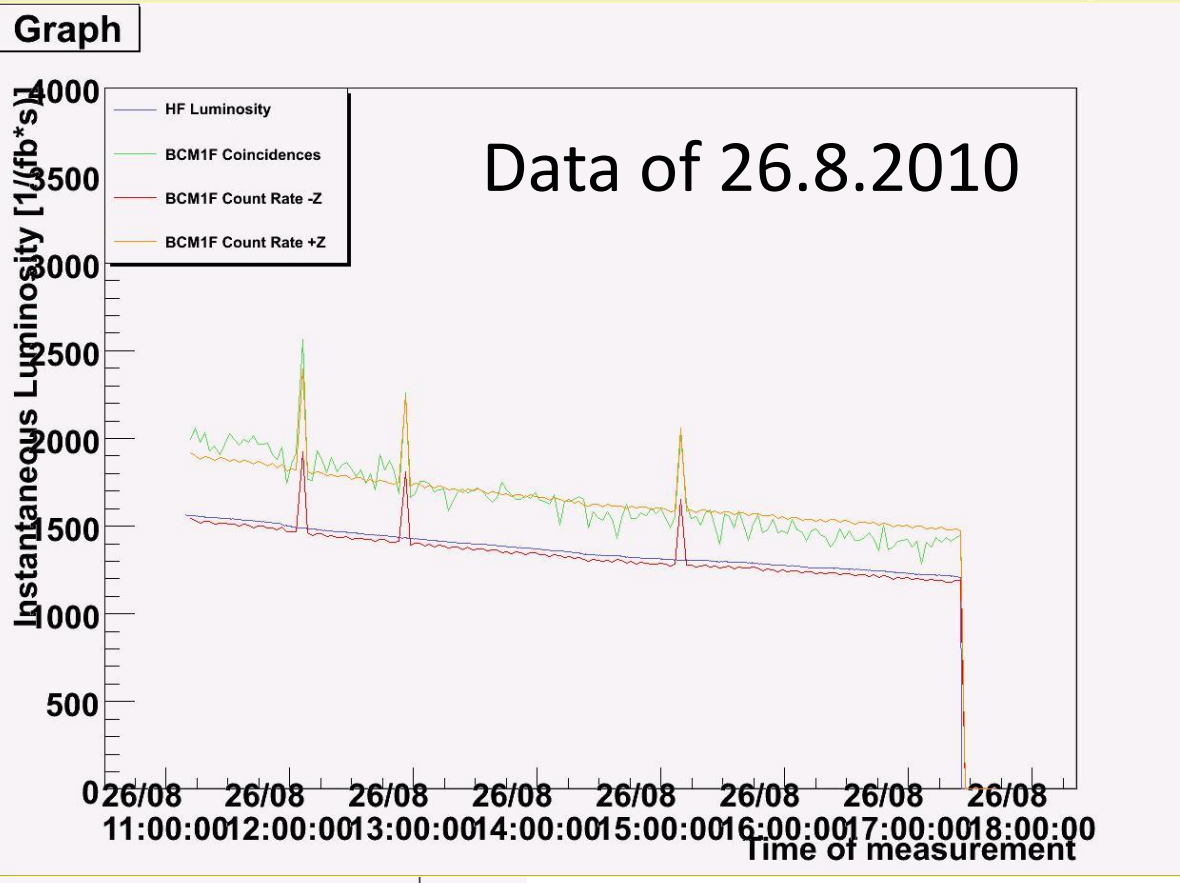
Slope of count rates and HF Lumi are similar

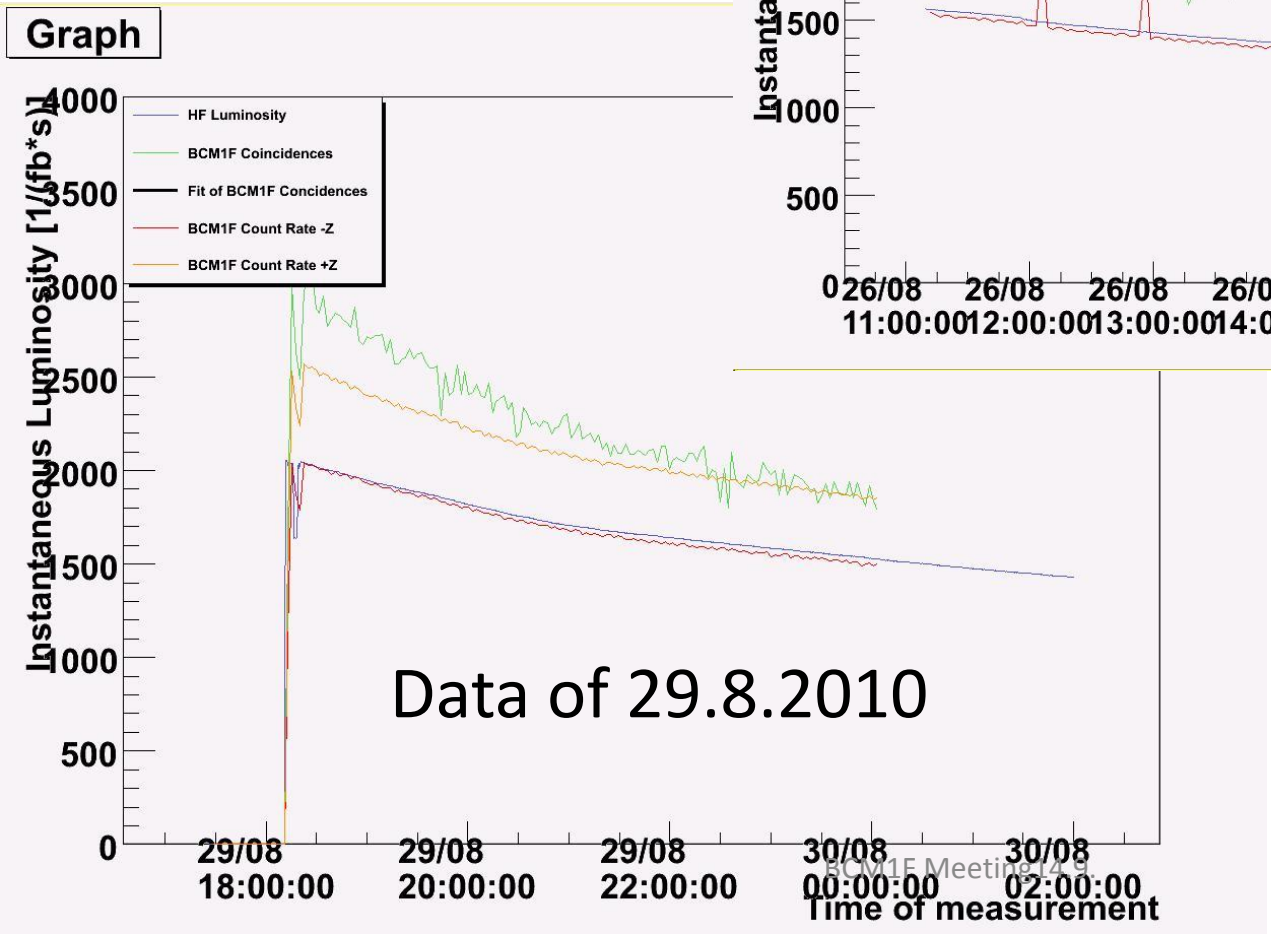


slope of coincidences and HF Lumi are a little bit different

Count rates and HF Lumi are similar → Scale factors are fine

Rate of the coincidences are different for different runs





Slope of count rates are similar for different data

Conclusion

- Behaviour of count rates are similar to HF Lumi
- Scale factor for count rates are fine
- Slope of the Coincidences are different to HF Lumi and count rates
- Scale factor for coincidences is valid only for one specific data
- Need more understanding: Why is the slope of the coincidences different from count rate and HF Lumi?