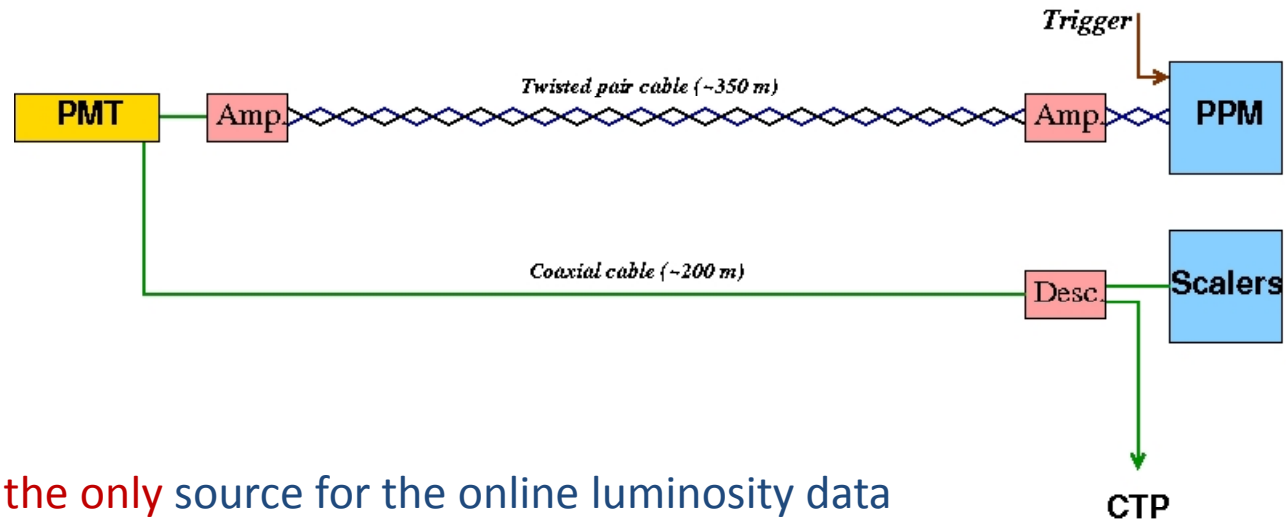
# ZDC online luminosity data

A. Poblaguev

# ZDC readout schema

## (Luminosity related part)




- For ZDC, scalers are the only source for the online luminosity data
- Scalers readout is not in the TDAQ.
- Scalers can be read with frequency of about 1 Hz directly from the VME crate.
- No correlation of the scalers counts with Orbit, BCID, …
- Signals from each of the 3 (4) ZDC modules in each Arm, as well as their logical combinations may be used for the luminosity monitoring.

# Scalers readout implementation

Currently, analog sum of all signals from each of two arms and the coincidence of these two sums are counted in scalers.

- Readout by standalone program. Counts are published in DIP and are displayed (trends) in DCS.
- Periodical readout from TDAQ segment. Counts and short term (~5 min) history is published in IS/OH.

Current implementation is rather testing of TDAQ/DCS than a Luminosity monitoring. Improvements in output format are required.

# Rate vs. Luminosity

$$Rate = k * Luminosity + Noise$$

***Noise*** (background) is expected to be small (To be verified !)

$$k = k\ (threshold,\ gain,\ physics,\ luminosity)$$

A big skepticism about the possibility to obtain ***k*** from Monte-Carlo.
***k*** must be determined during luminosity calibration.

$$L(t) = L_0\, R(t)/R_0$$

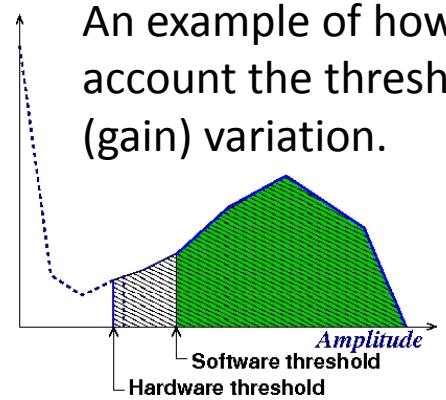
( $L_0$ and $R_0$ are luminosity and rate at calibration.)

**How may we know that *k* is stable ?**

# How to control *k* ?

A lot of information for the ***k*** control may be obtained in the analysis of the ZDC events triggered by the ZDC itself.

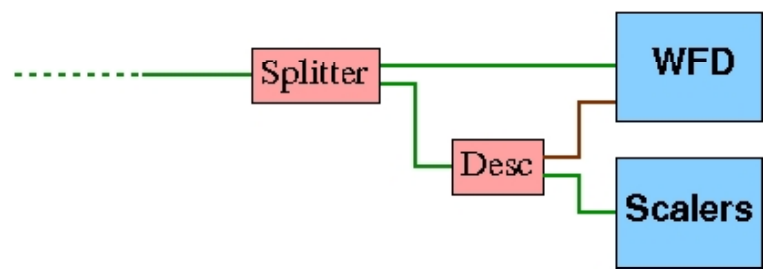
An example of how to account the threshold (gain) variation.




This method may not work for current ZDC configuration:

- Signal shapes in PPM and Scalers are not the same.
- Variation of amplifier gains is not under control.

We may want to readout ZDC signals which are counted in scalers. Can we use PPM (as WFD) in this schema?



# Conclusion

- Luminosity monitoring is not a simple task …