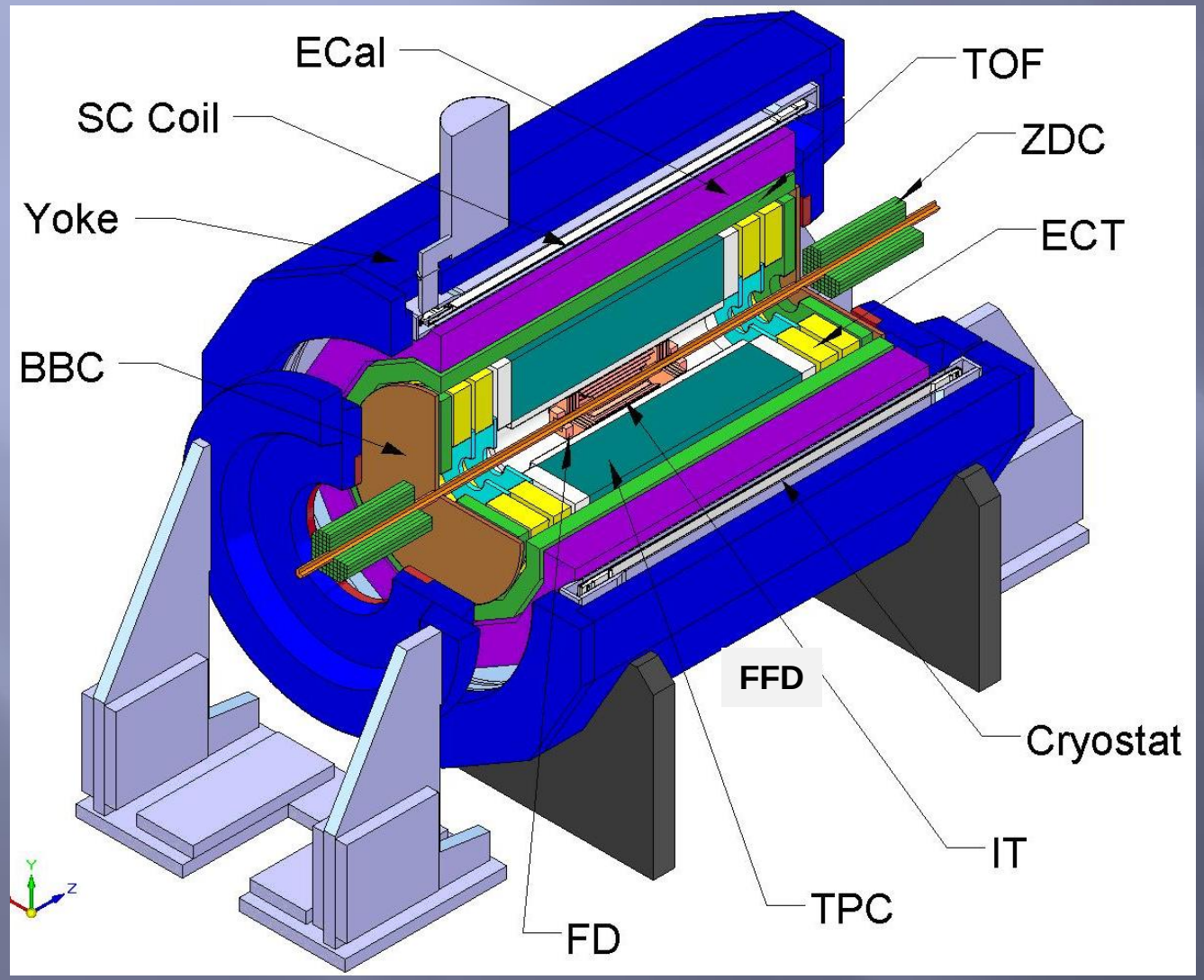
D. Dąbrowski, M. Peryt, K. Rosłon

Gas system for MPD Time-of-Flight detector

MultiPurpose Detector (MPD)



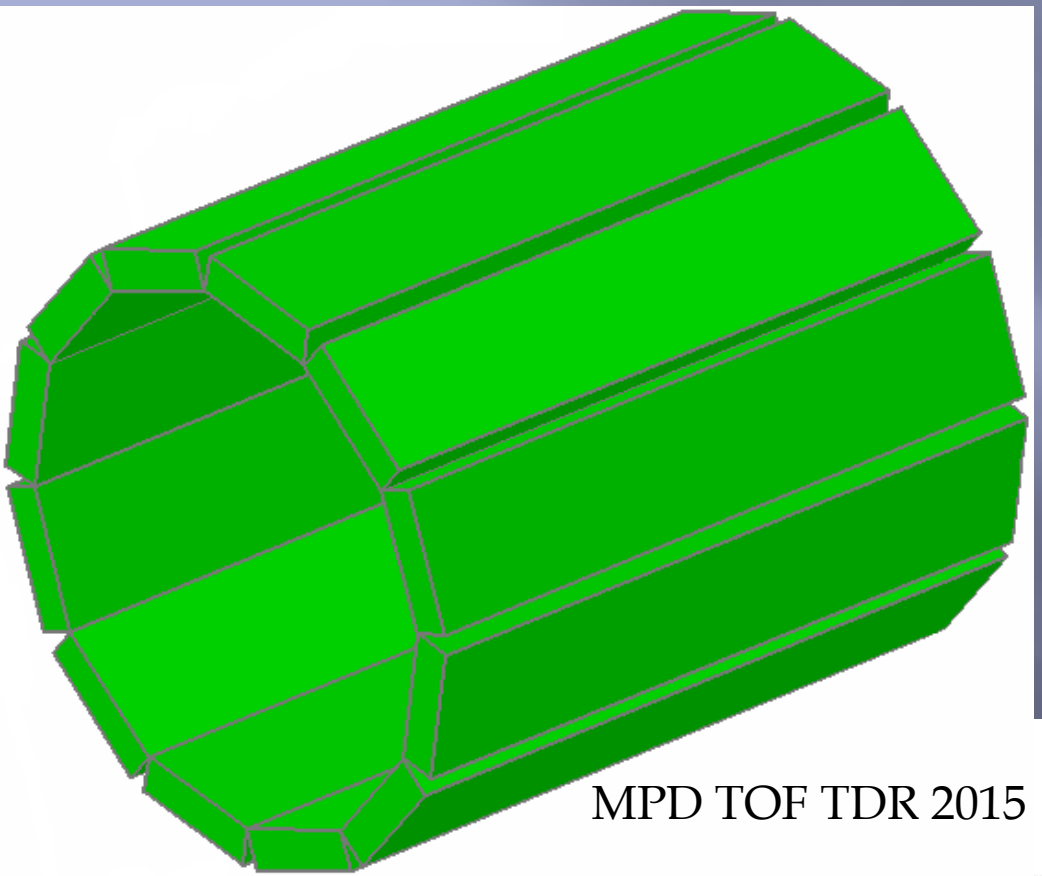
Tracking: ***TPC, IT, ECT***

T0, Triggering: ***FFD***

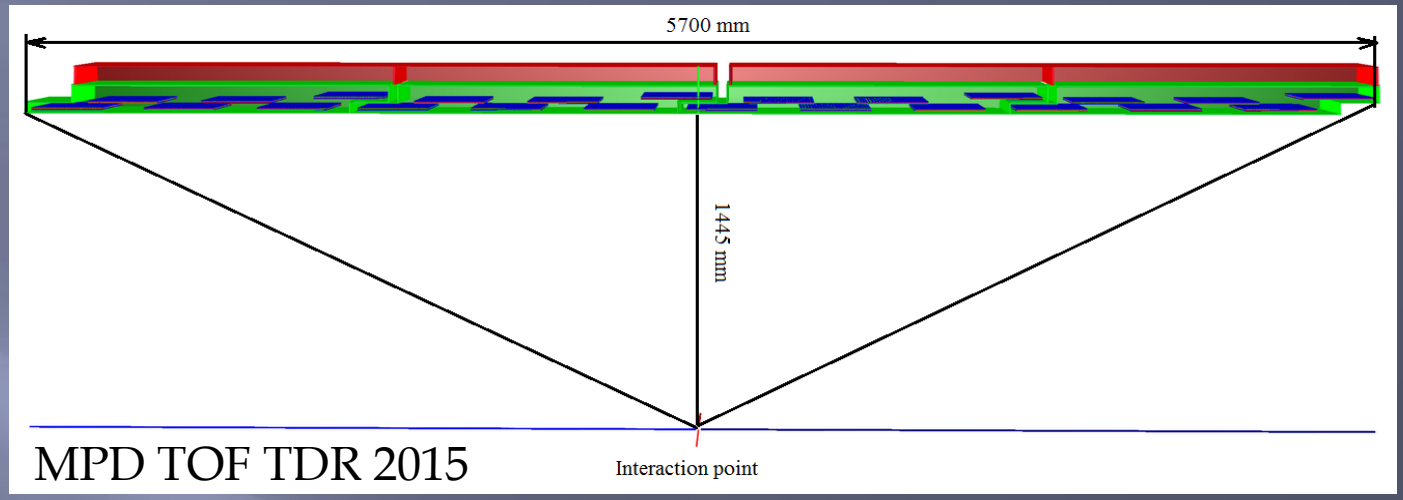
Centrality, Event plane: ***ZDC***

Particle ID: ***TOF, ECAL, TPC***

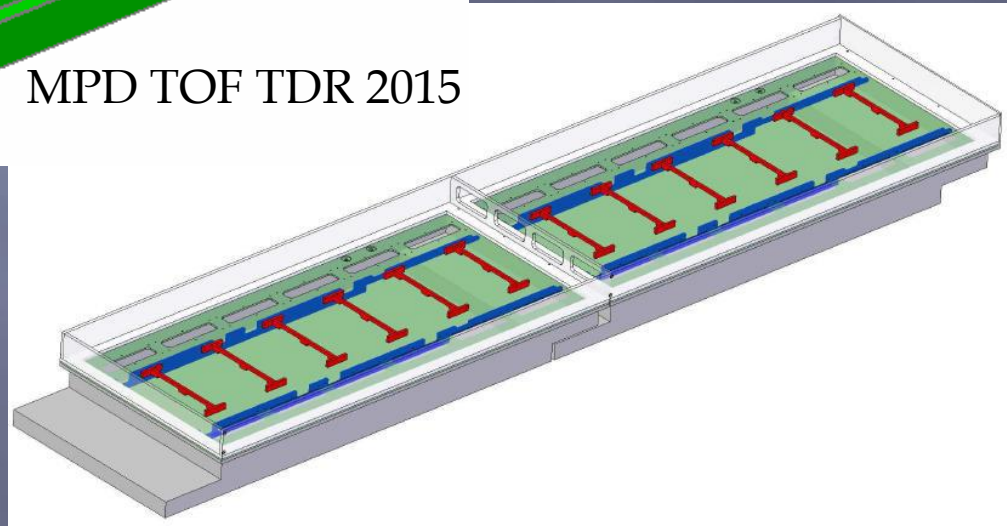
Time-Of-Flight (TOF) detector

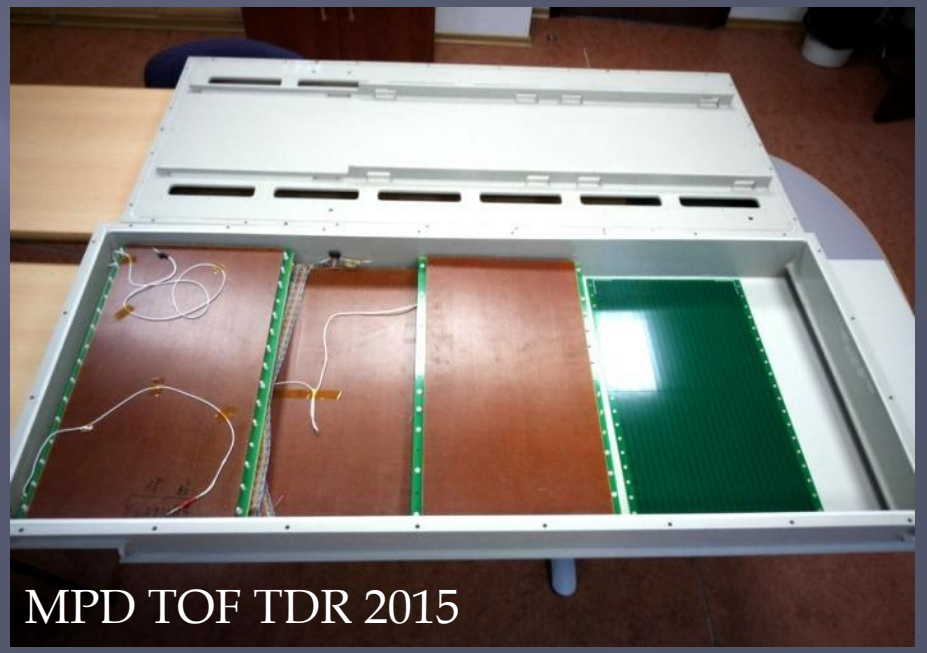


MPD TOF TDR 2015



MPD TOF TDR 2015

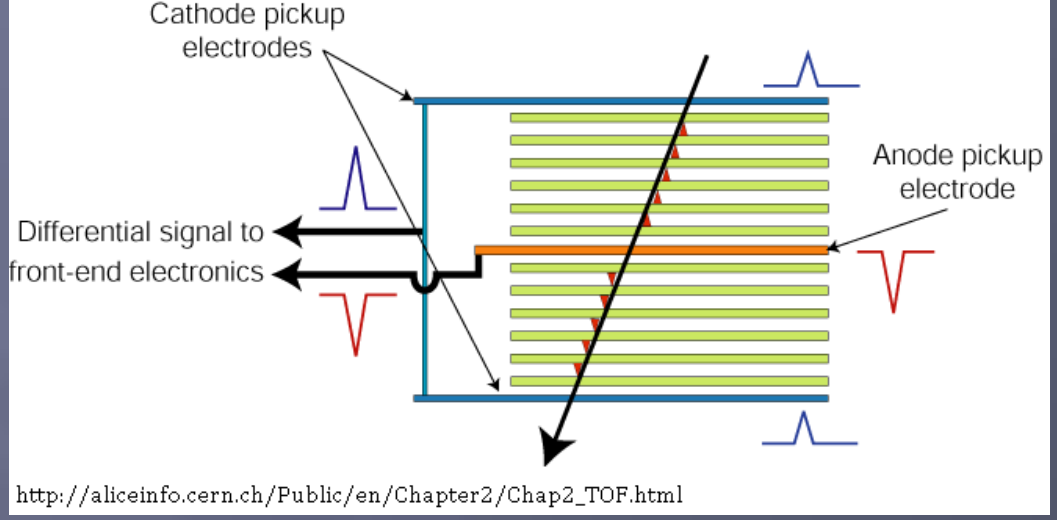


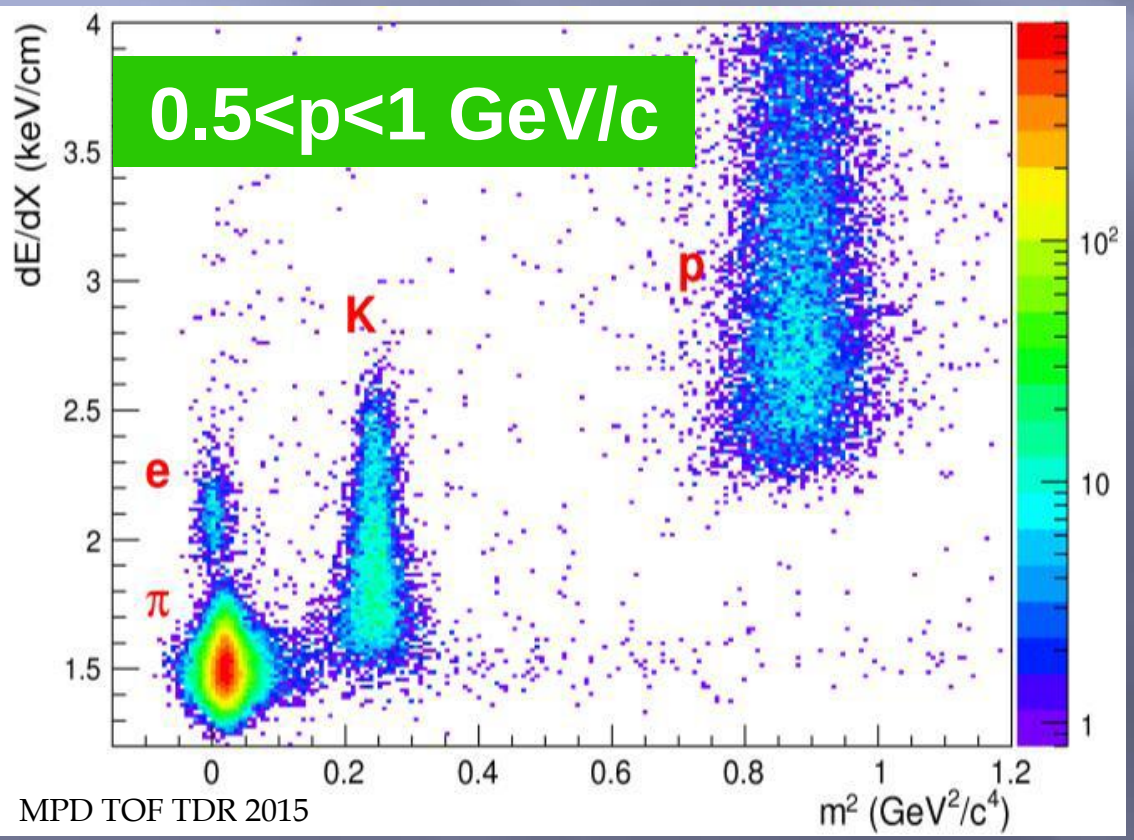


MPD TOF TDR 2015

How does it work ?

Particle IDentification (PID):

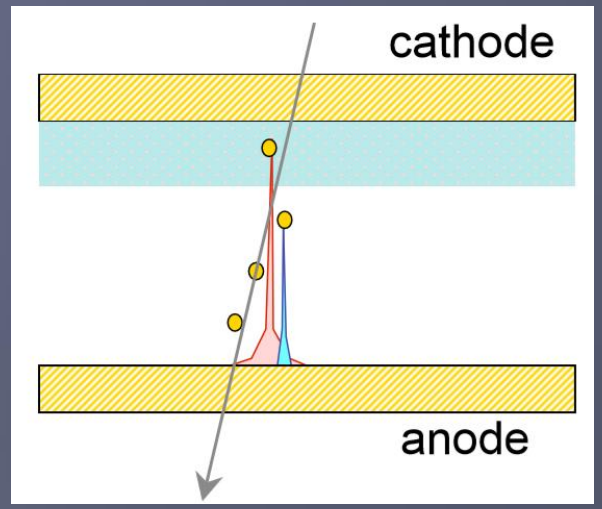




MPD TOF TDR 2015

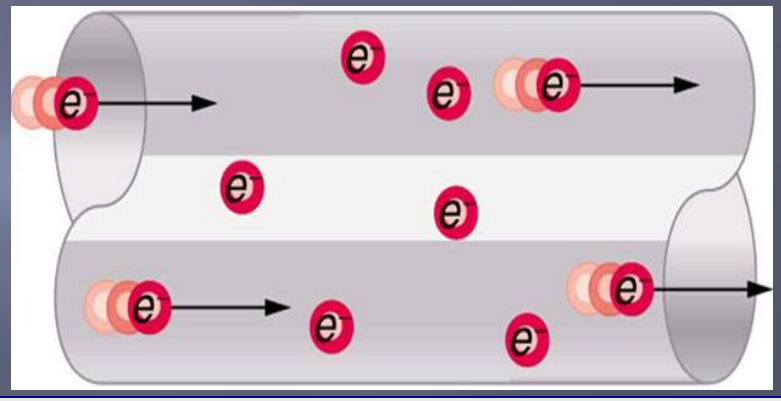
$$m^2 = p^2\left(\frac{ct^2}{l^2} - 1\right)$$

Gas mixture requirements:



- Low threshold of avalanches

- Fast (high electrons drift velocity)



- No secondary effects, like photon feedback

- Cheap, Eco-friendly, safe, not ageing

Gas Mixture

90% $C_2H_2F_4$ + 5% i-C_4H_{10} + 5% SF_6

Purity

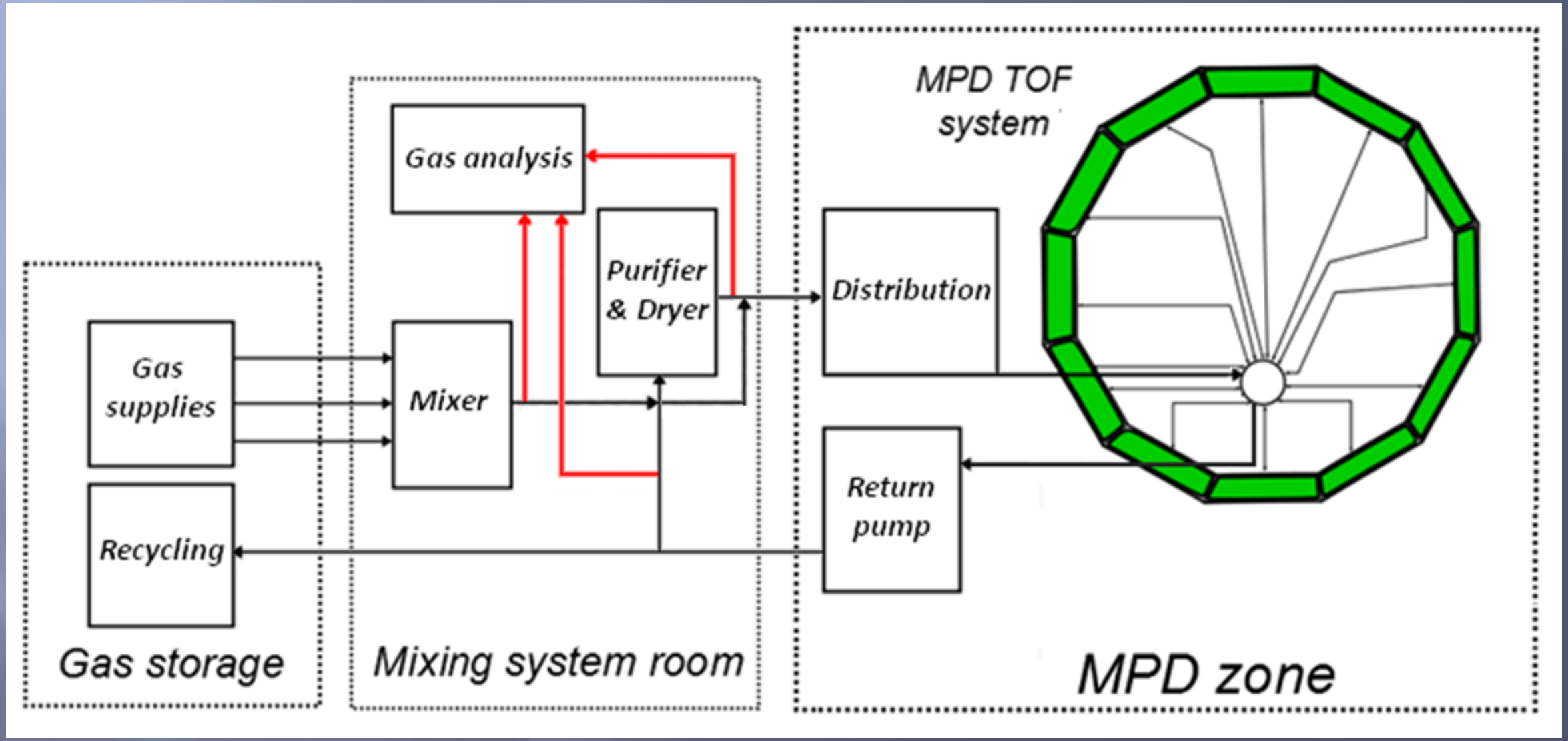
Two effects:

- modification of transport parameters
- electron loss by capture due to electro-negative pollutants

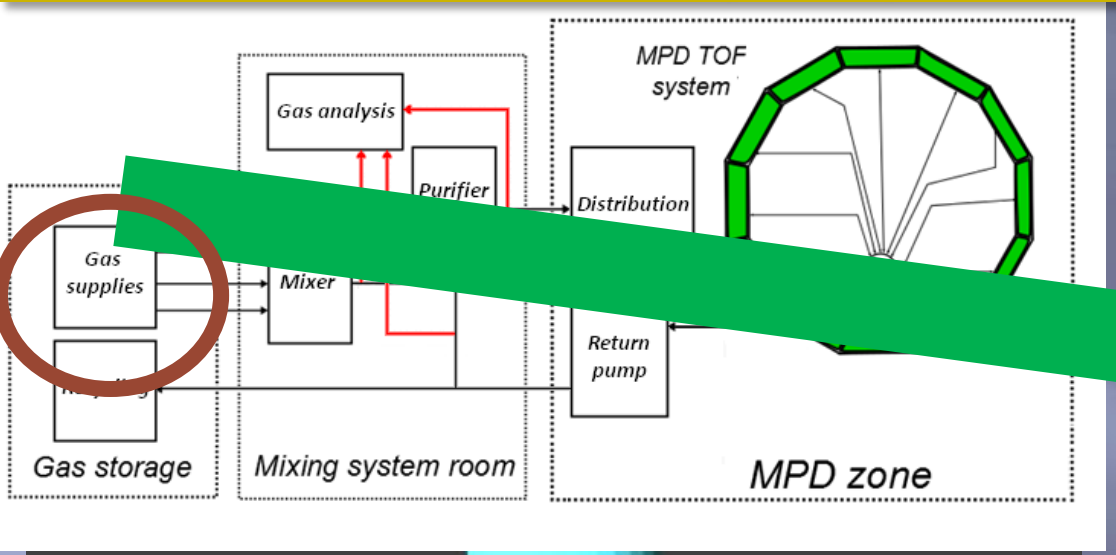
H_2O content: < 100 ppm

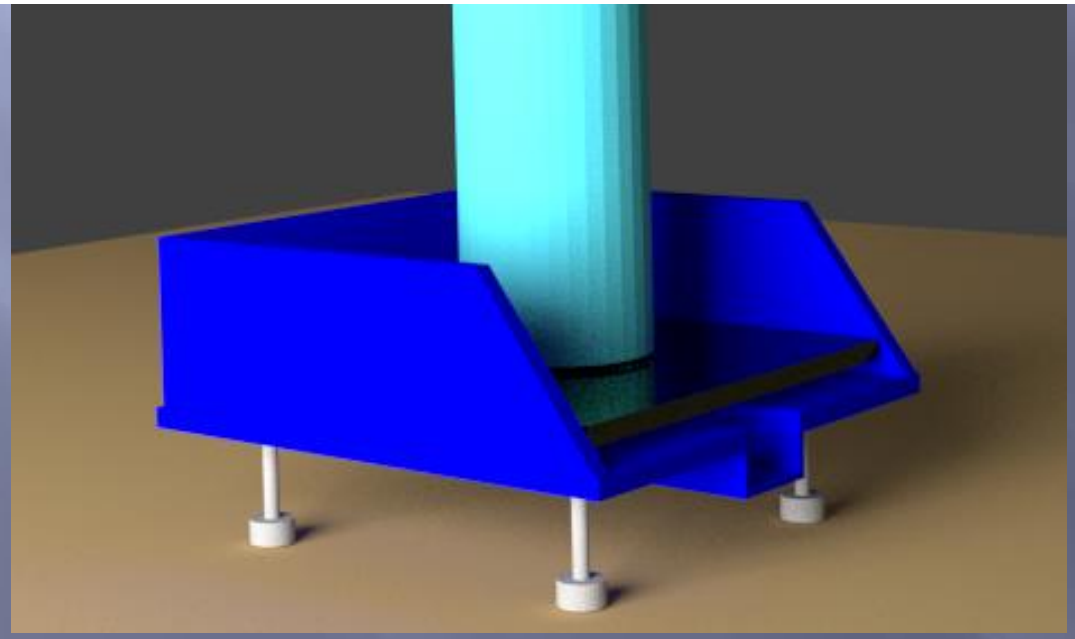
O_2 content: < 1000 ppm

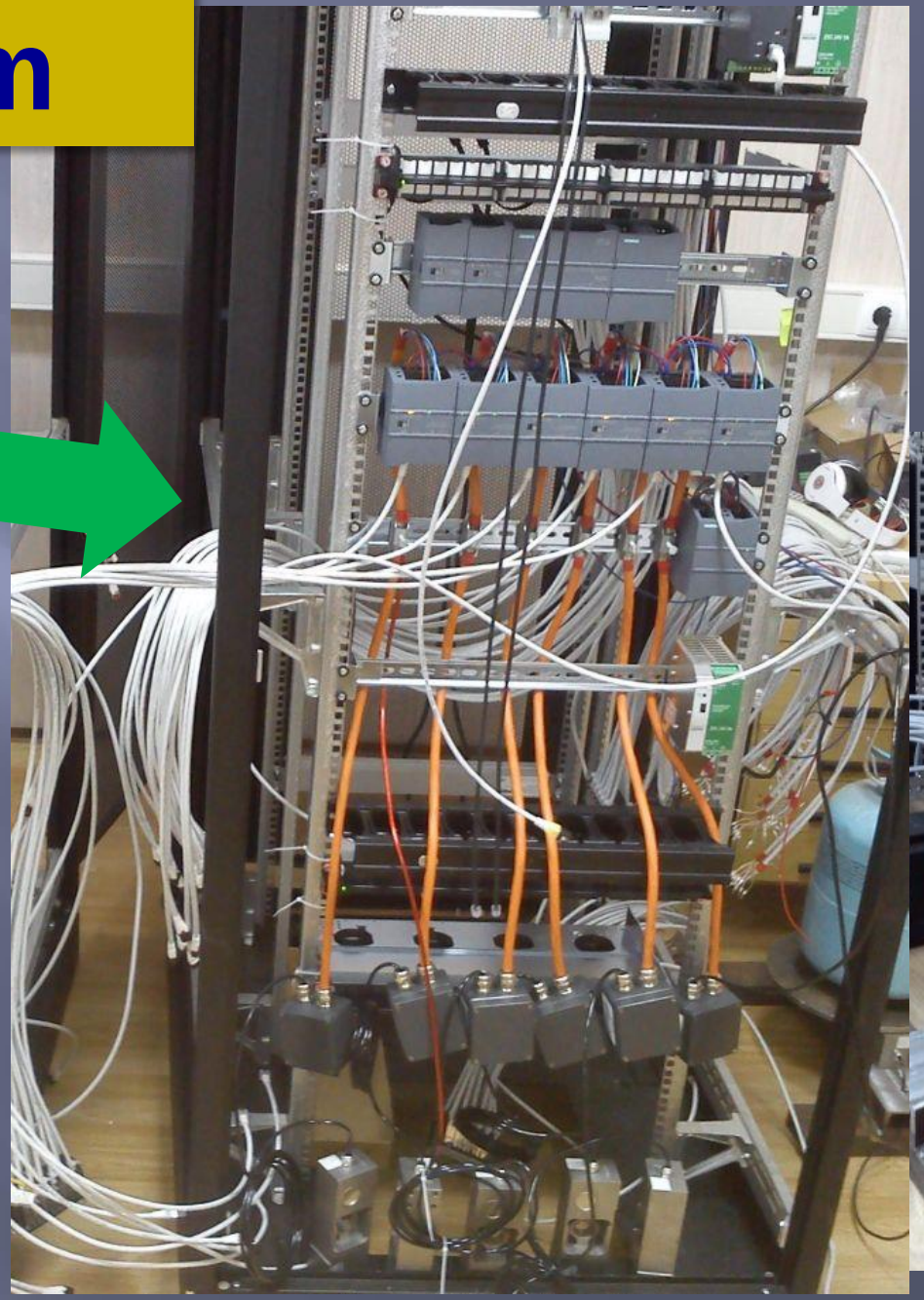
Gas system


MPD TOF system
Gas analysis
Purifier & Dryer
Distribution
Gas supplies
Mixer
Recycling
Return pump
Gas storage
Mixing system room
MPD zone

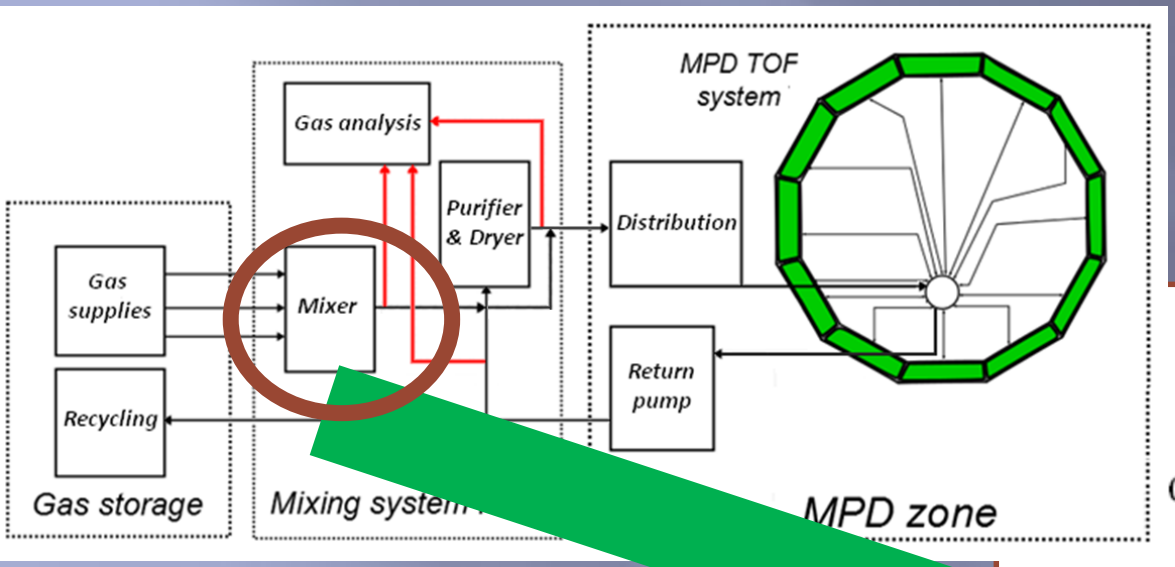
Gas supply system







Mixer


MPD TOF system
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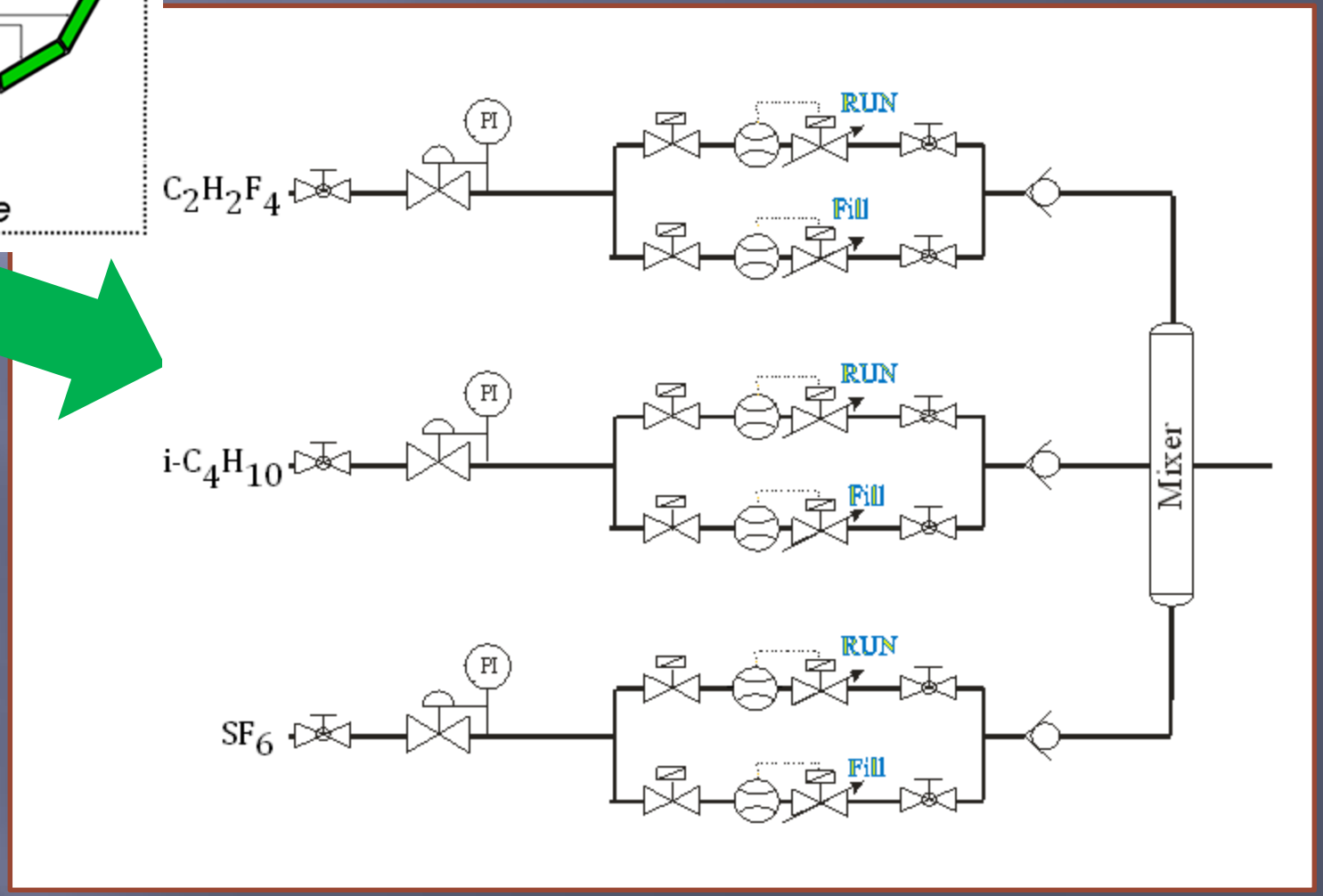
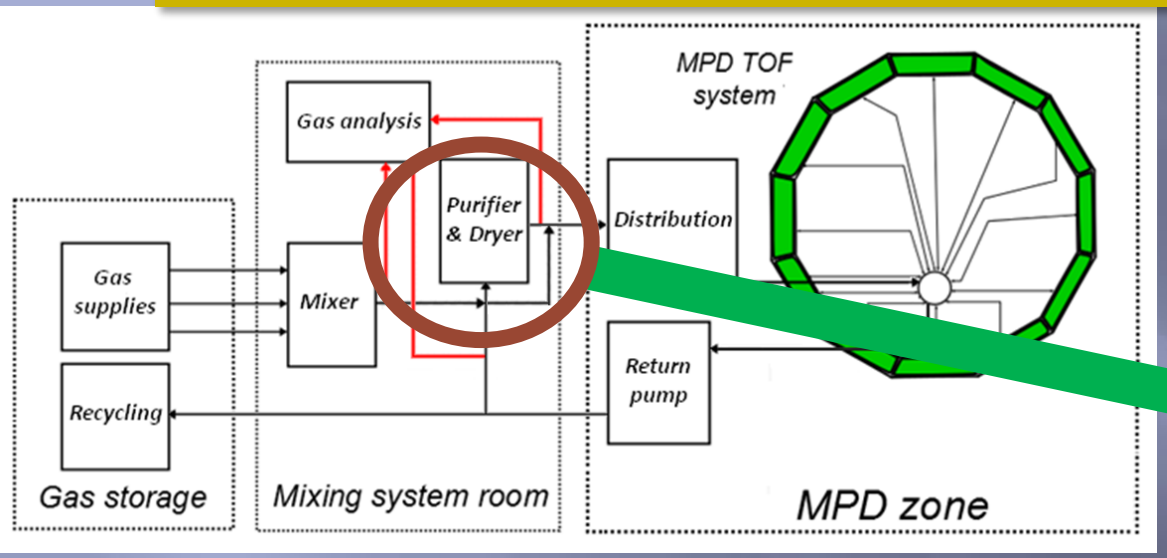
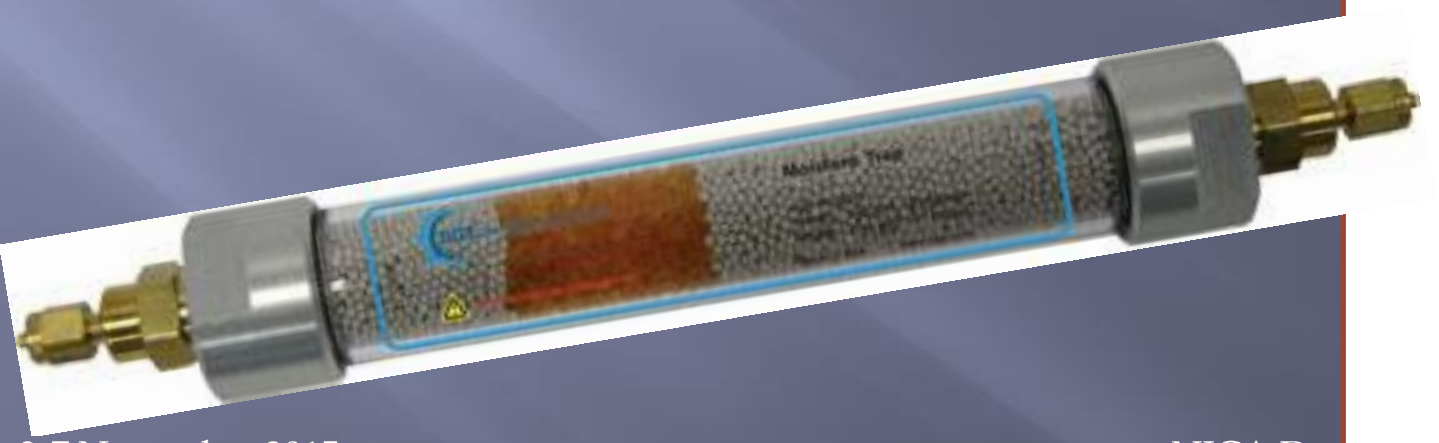
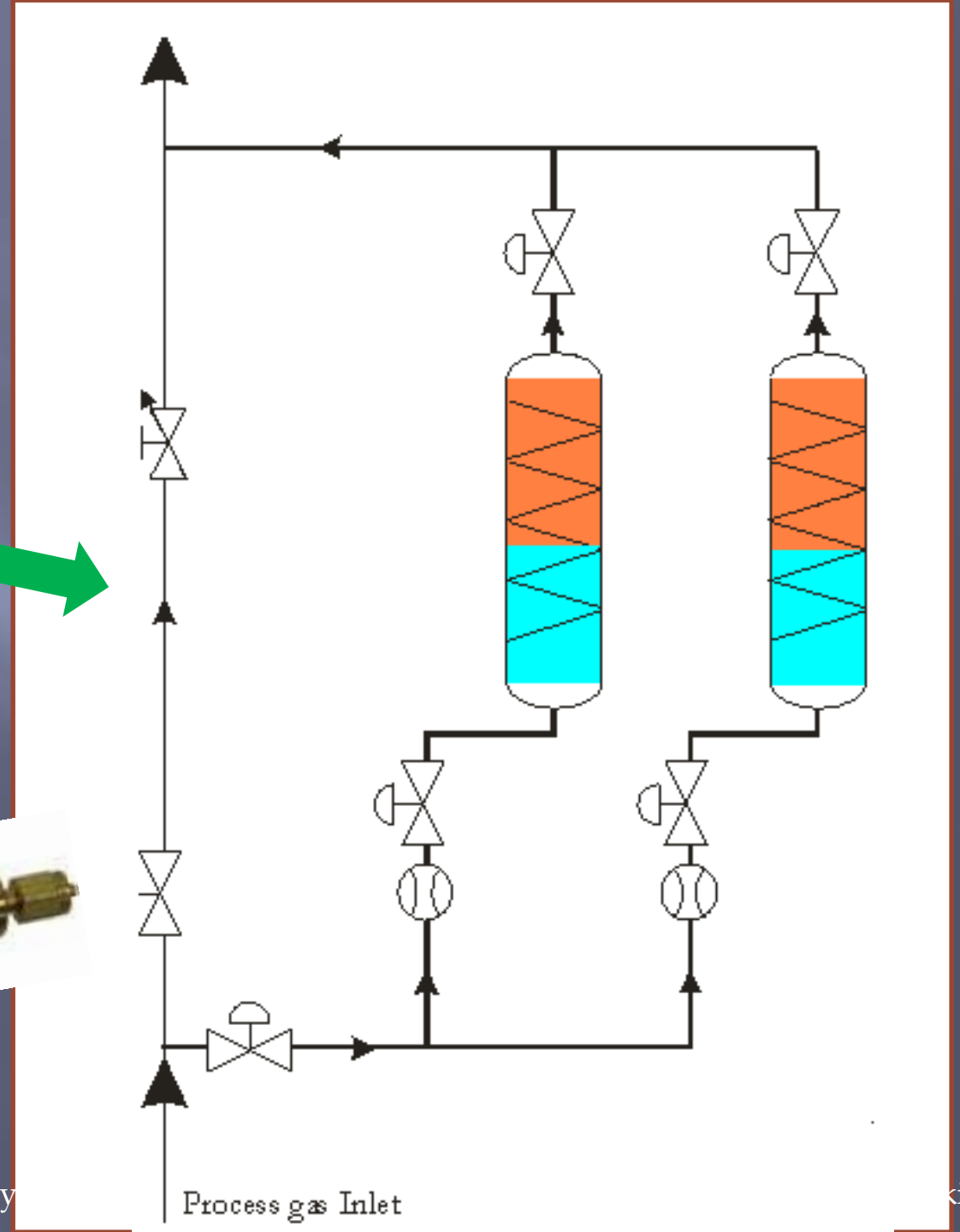

$C_2H_2F_4$
$i\text{-}C_4H_{10}$
SF_6
PI
RUN
Fill
Mixer

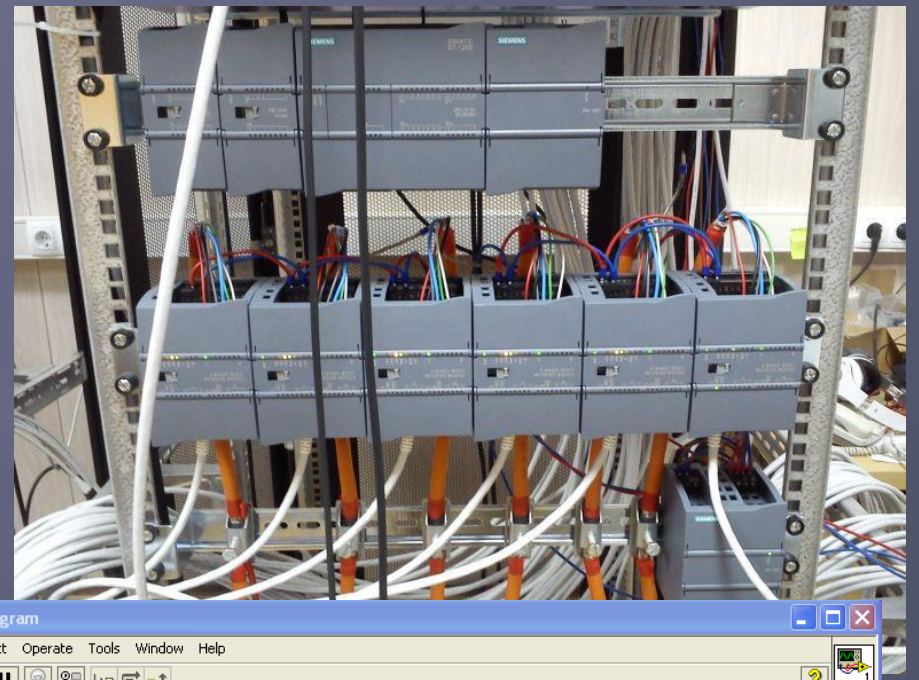
Purification

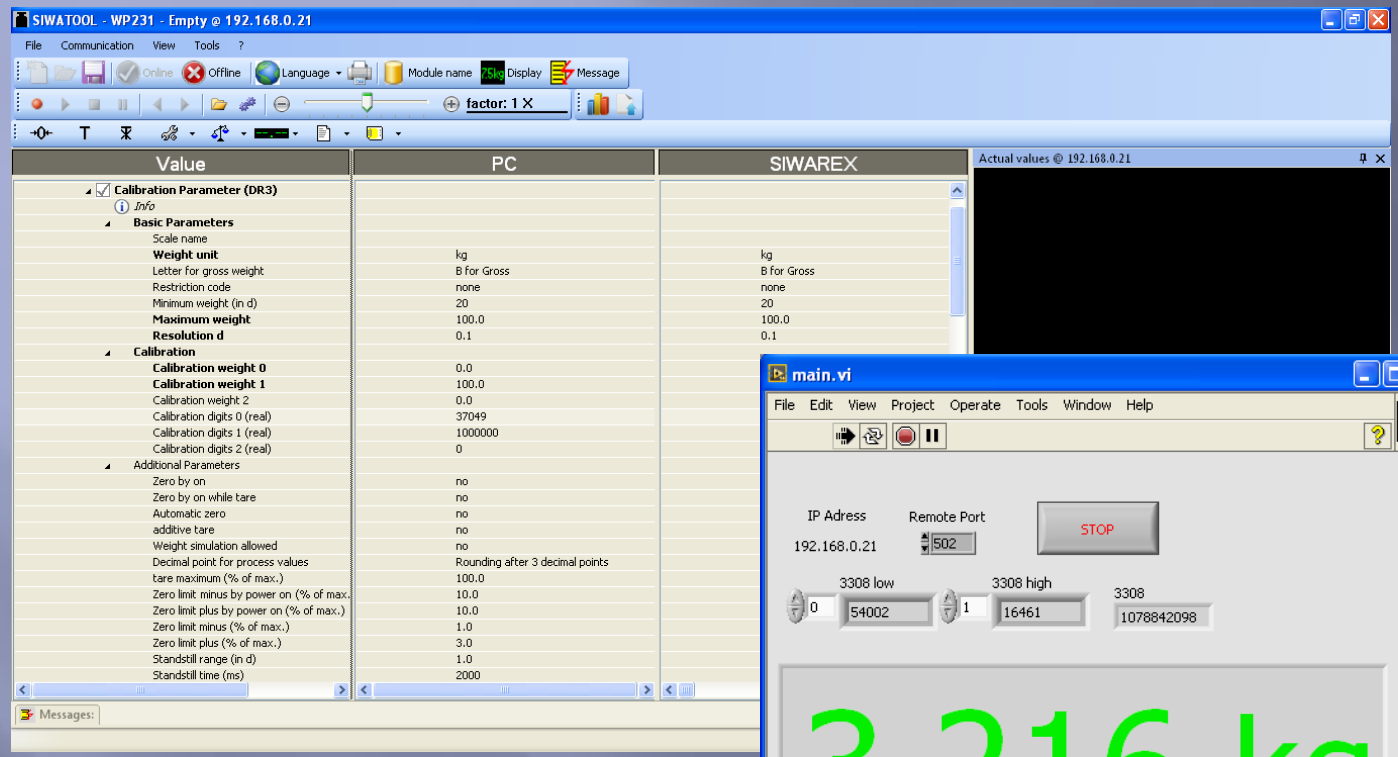


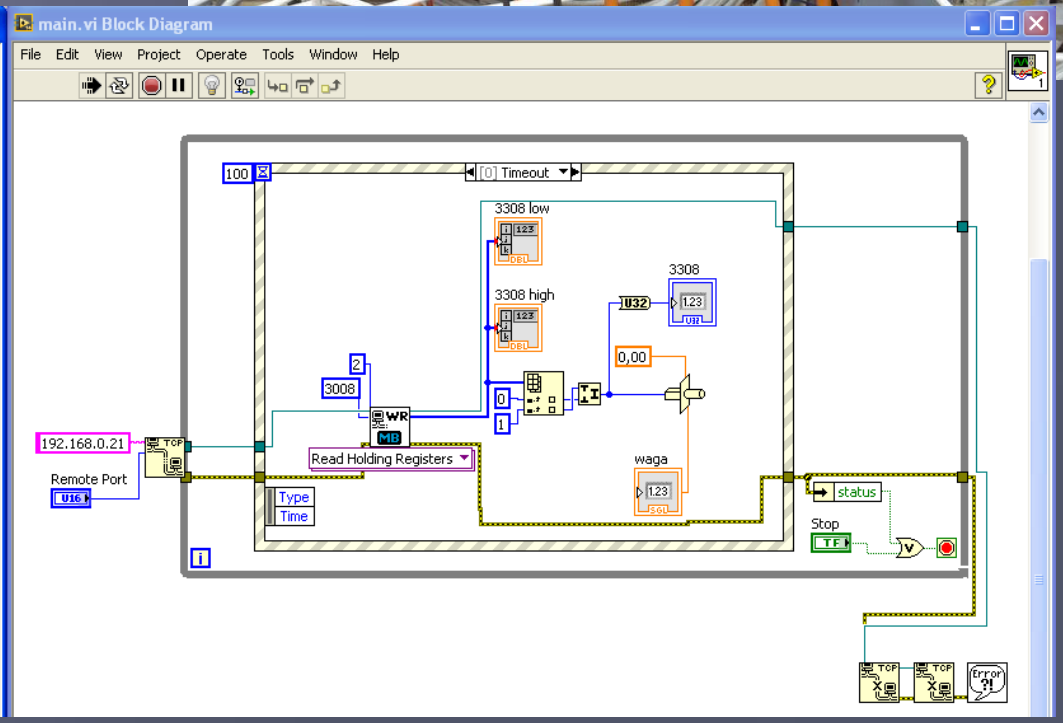




Control system







Thank you for your attention !