# **WP2: Analysis Summary**

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## **ER/NR (Oppedisano)**

https://agenda.infn.it/event/46680/contributions/262856/att achments/134276/200867/Early ML for discrimination.pdf

- Work with ML directly on image data to classify cluster nature
- First tests training on pedestals to remove on sensor tracks

https://agenda.infn.it/event/47007/contributions/264713/att achments/135157/202381/ML\_sensor\_on.pdf

https://agenda.infn.it/event/47642/contributions/268925/att achments/137097/205919/Pres\_roma.pdf



Excellent results

- To equalize the dataset a training on real ER is foreseen as well as simulated NR
- Possible anomaly detection on latency space

#### Rn Daughters (Piacentini, Dho)

- Goal: understand background
- Found misterious event population at few tens of keV in corrispondence to high Rn content dataset



PMT waveforms and shape variable analysed



Radon + NR overlay

Interpreted as the <sup>210</sup>Pb recoils from Rn daughter attached to cathode

#### **Copper From GEMs (Pinci)**

- At lower energy another population of events appears at different z
- Present also without Rn



3

- Studies on z distribution and saturation suggest it could be caused by a 7-8 keV photon
- Compatible with Cu fluorescence from GEM (Still work to do)

#### **PTOH Calibration (D'Astolfo)**

Towards the analysis of Run4/5 data and generalisation of the data analysis

https://agenda.infn.it/event/47007/contributions/264603/atta chments/135169/202402/cygno meeting slides 8 05 25.pdf

https://agenda.infn.it/event/46839/contributions/263662/att

achments/134804/201785/calibration.pdf

• Correction of light yield vs the environmental variables of the gas (pressure, Temperature, humidity, oxygen)

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Using <sup>55</sup>Fe calibration

Bayesian fit calibration

Improving the <sup>55</sup>Fe data points and checking their intrinsic fluctuation

## Z and Tracking with ML (Scamporlino)

https://agenda.infn.it/event/47087/contributions/265786/att achments/135681/203466/Slides%20for%202205%20ppt.pdf

- Goal to remove diffusion contribution of diffusion in images (tracking) and retrieve <a href="https://agenda.infn.it/event/47642/contributions/268835/att">https://agenda.infn.it/event/47642/contributions/268835/att</a> z calibration (fiducialisation)
- Exploiting GIN setup with muon tagging at fixed z
- ML technique applied on muon events







#### **Oxided GEMs (Dho)**

- Goal: characterise GEM of CYGNO-04
- V-bonded GEM might have hole structure with less copper around holes
- While same light yield can be achieved (exploiting also updated optics), saturation seems to be lower

6



Also new hints that intrinsic diffusion affects diffusion

# **Trigger (Pains)**

https://agenda.infn.it/event/46839/contributions/263854/attachments/134809/201793/Trigger%20Proposal%20Status%20-%20April.pdf

• Goal: data reduction at trigger level

https://agenda.infn.it/event/47642/sessions/34403/attachments/1371 35/205984/Cygno%20Joint%20WP%20meeting.pdf

- ML learning technique allowed to find suitable threshold for pixel selection
- Saving algorithm based on squares around above threshold
- Reduction achieved looks on par with requirements (factor 50-100)
- Optimisation required on the number of pixels stored with respect to past (and effect on energy and long tracks)

