Task 2.2 Status

1. PhD student at DESY (David Spataro) started looking into 4D pattern recognition with quantum algorithms
   - First reconstruction of full vertex detector done (no time preselection)
   - Decent (~50%) efficiency down to particles with $\square$ ~ 0.2 for small fake rate
     - Planning dedicated <u>follow-up</u> report soon

2. Calorimeter digi/reco (toward 5D reconstruction)
   - Successfully moved to granular realistic digi processor (RealisticCaloDigi) from latest ILD setup
   - Studying effects of calo cell selection on object resolution (sneak peek of first findings at <u>MDI meeting</u>, strategy similar to the one used by Lorenzo in the talk at the <u>2021 APS meeting</u>)
     - Might use high significance cells as seeds for clustering

Contributors to WP2 still quiet.

- Planning for a round of explicit pings after winter break
- Feel free to get in touch at any time!

Thank you!

Mandate and scope (reminder)

Task 2.2 Design and implementation of event reconstruction algorithms in 5D at √s=3 TeV and √s=10 TeV (DESY)

This task will focus on developing reconstruction algorithms exploiting 3D position, energy, and timing measurements to mitigate beam-induced background and perform tracking and calorimetry clustering. Leveraging on the developments made for future colliders, this task will explore machine learning solutions and parallel computing, both for real-time event processing and for offline analysis, taking into account the specific challenges of a muon collider (e.g., particle tracking in the forward region).

Table 3.1b.2: WP2 - Workpackage description

Work package number	2		Lead beneficiary				UNIPD		
Work package title	Physics and Detector Requirements								
Participant number	8	1	6	5	2	18	10		
Short name of participant	UniPD	CERN	INFN	CEA	DESY	UOS	LIP		
Person months per participant:	24	0	12	12	12	12	12		
Start month	1		End month	48					