A novel reconstruction algorithm for an imaging calorimeter for HL-LHC e.g. HGCAL

- Great potential (rich set of info); yet big challenges: pileup, comp resources, ...
- The Iterative CLustering framework (TICL):
  - Modular fwk designed to fully exploit HGCAL potential
    - Goal: process the energy deposited by particles and return particle properties and probabilities
  - Main components of TICL:
    - Clustering: developed CLUE algorithm
      - using a concept of local energy density
    - Pattern recognition/3D object reconstruction:
      - based on cellular automaton

TICL components

- Tracks
- PID
- Denoising
- Rechits
- 2D Clusters
- Seeding Region
- Tracksters
- PFTICLProducer
- Timing
- Energy Regression
- Trackster Splitting
- MIP
- Tracksters

NB: CLUE and TICL designed to be GPU-friendly
- Suitable for the upcoming era of heterogeneous computing in HEP

CLUE: clusters almost all deposited En.
TICL: contain a large fraction of it
En. resolution: Very encouraging results

Energy response

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<tr>
<th>CMS Phase 2</th>
<th>Simulation Preliminary</th>
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<td>Single-(\gamma)</td>
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<td>PU=0</td>
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Energy resolution

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<th>Stochastic</th>
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<td>TICL</td>
<td>25%</td>
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Connecting the dots (2020)

Loukas Gouskos