

Proposed GEM Pad numbering scheme

Each GEM pad in the mTPC should have a unique ID.

A pad is uniquely identified by the plane number, the ring number, and the pad number within a ring.

g = plane ID (0-31)

r = ring ID (0-31)

p = pad ID within ring (0-512)

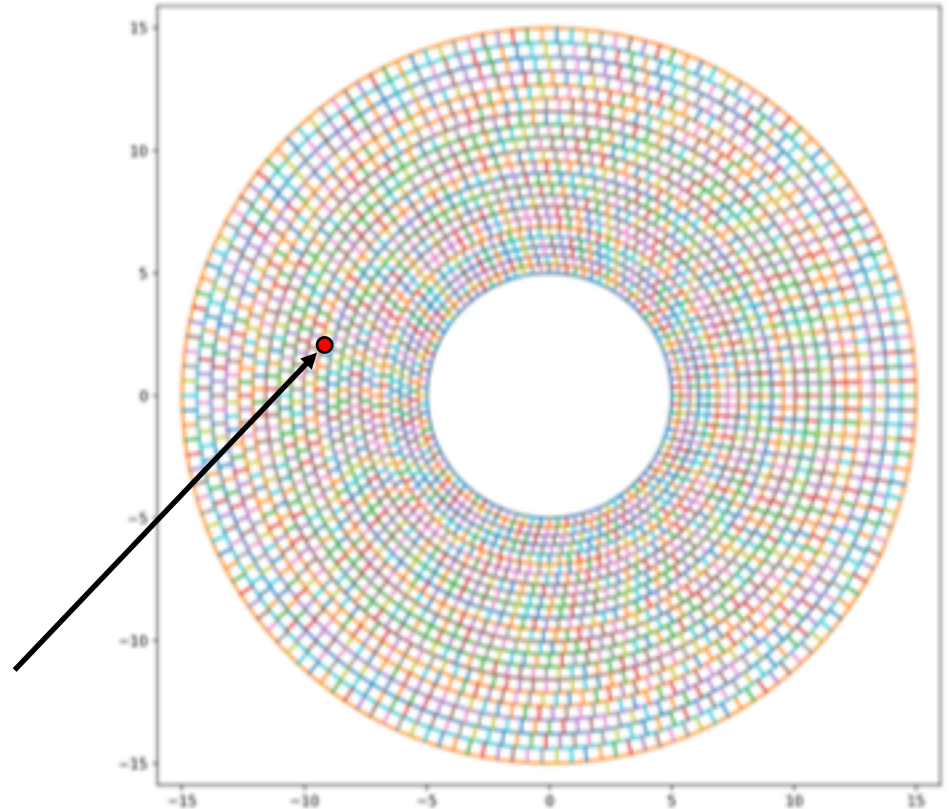
Binary pid layout:

$pid = ggg|ggrrlrrr|pppp|pppp$

$g = (pid \gg 18) \& 0x1f$

$r = (pid \gg 9) \& 0x1f$

$p = pid \& 0x1ff$



e.g. plane 5, ring 5, pad 87 \rightarrow $0x140A57 = 1313367$

Proposed mTPC definition data structure

```
{'planes':
  [ {'id': 0,
    'z': -25.2,
    'direction': -1,
    'rings':
      [ {'id': 0,
        'rin': 5.0,
        'rout': 5.3532,
        'r': 5.1766,
        'phi0': 0.0,
        'npads': 92},
        { 'id': 1,
          'rin': 5.3532,
          'rout': 5.7186,
          'r': 5.5359,
          'phi0': 0.0,
          'npads': 95},
          ... ],
    ... },
    { 'id': 20,
      'rin': 14.40056,
      'rout': 14.99999,
      'r': 14.70028,
      'phi0': 0.0,
      'npads': 154 } ] },
  ... ] }
```

direction - Direction of ionization drift
phi0 - Azimuthal angle of center of pad 0
z - z position of surface of GEM plane

Why?

Need a scheme to define mTPC structure so that simulation (geant4 or toy model) and analysis (tracking) work from commonly understood geometry.

Digitized event output of a simulation is a list of pad id's with a TDC (and ADC?) value.