Pixel TPC Modules costing estimate

- Costing for the pixel read-out system
  - TimePix chip includes part of read-out electronics (1)
  - Additional power boards per module for HV and LV (2)
  - Post processing to make e.g. InGrid (3)
  - SPDR readout system board (4)
  - Precision mechanics, PCB, integrated cooling (cold carrier) (5)
- Costing of masks, development of dedicated TPXn chip with lower power consumption for the pixel read-out
  - For TPX3 500 k€ (TPX4 700 k€)
  - Wafer price TPX3/4 3 k€ assume 80 good chips
  - Need 80k TPX3 chips for full TPC
  - Total cost (item 1) 3.5 (3.7) M€
- Use typical factor 2 (large Si detectors) as cost for items (2)-(5).
- Total cost factor 3 - without manpower – 10.5 (11.1) M€

Pixel TPC Modules costing estimate

- Current extrapolated costs TPX3 of one LargePrototype module
  - Wafer 100 chips   4 k€
  - Post processing   1.5 k€
  - SPDR system   3 k€
  - HV/LV Powerboards 0.5 k€
  - Flex dedicated PCB   40 k€ (2019 very expensive, small quantity)
- For TPX4 first thoughts now:
  - Without through vias TPX3 like: can use a less expensive PCB
  - With through vias needs ideas: additional costs for connections
- For a full size detector will have a dedicated chip ILC-TPXn
  - Optimized for through vias, coverage, time resolution and power

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