

Parameters of final ILD TPC

1.) List: Parameters driven by physics

Preamplifier: input capacitance (5-20 pF)

shaping peaking time (60-200 ns) Martin Ljunggren MSc

sensitivity (1-10 mV/fC)

polarity (negative)

dynamic range (SALTRO: 150 fC, AFTER: 120, 240,?,600fC) dE/dx

linearity error <1% for full dynamic range dE/dx

noise (<600 electrons)

Shaper: restoring to baseline in units of counts

at least 1 μ s for Micromegas (not to lose the signal on side pads)

ADC: number bits (8-10) Wenxin's thesis (Saclay), Liangliang's thesis (Lund) for spatial resolution

sampling frequency (20 - 40 MHz)

Time of continuous readout: \sim 800 μ s (full bunch train)

2.) List system driven by other considerations

Input leakage current compensation (if too high -> noise, but may be necessary, e.g. for protection diodes)

pad density (1/4 of smallest pad size per channel)

Power consumption: 4 mW/channel (without power pulsing) -> 20 W per Module (5000 channels) -> 1 kW per endcap with power pulsing (+ at least a factor of 5 in power reduction by power pulsing)