Compare Hall B and Hall D fadc firmware

- Same Control FPAG firmware, different ADC processing FPGA firmware
- Same pulse definition, and pulse time algorithm
- Hall B firmware works with VTP, while Hall D firmware doesn't. Hall D firmware works with CTP. VTP will be able to support streaming readout in the future.
- Besides the readout modes difference, Hall B version has DiagGUI support, charge scalers

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Readout modes

Hall D	Hall B
Mode 9: Pulse Integral Readout: Pulse sum, Pedestal sum, Pulse fine time, pulse peak	Mode 1: Raw Mode Readout: all samples in the PTW
Mode 10: Raw Mode Readout: all samples in the PTW in addition to all the Mode 9 data	Mode 2: Pulse Raw Mode Readout: Samples within NSA+NSB, Pulse coarse time
	Mode 3: Integral Mode Readout: Pulse sum, Pulse coarse time
	Mode 4: TDC Mode Readout: Pulse fine time, Pedestal, Vpeak
	Mode 7: Mode 3 + Mode 4 Readout: Pulse sum, Pulse fine time, Vpeak, Pedestal

- If any of the first 4 samples is greater than threshold, Hall D version will read out all samples in PTW, while Hall B version will report pulse time, Vpeak and pedestal as 0.

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Programmable Parameters

Hall D	Hall B
PL — trigger lookback, **PTW** — trigger window, **TET** — pulse threshold, **NSA** — number of samples after the first sample crossed threshold (TC), **NSB** — number of samples before, **MNoP** — Maximum number of pulses that will be processed	
NSAT — number of consecutive samples above the threshold, **NPED** — number of samples for pedestal sum, **MaxPed** — max pedestal threshold	**TET** — threshold for each channel, **PED** — pedestals for each channel, **ADC_MASK** —enable or disable certain channels, **TET_IGNORE_MASK,** and a bunch of parameters when using VTP for generating triggers.

Summary and Questions

- Hall B mode 7 is basically the same as Hall D mode 9 except when the first 4 samples are above TET, the readout data would be different

—-> This can be implemented to the Hall B version

- SHMS/HMS Cherenkov and Aerogel channels in mode 10 —-> Hall D mode 10 and Hall B mode 1 are different; Will mode 1 be sufficient?

- Ben Raydo mentioned that he can add mode 9 and mode 10 to Hall B version

- People mentioned reading out raw waveforms —-> Will that require some changes on hcana and online replay scripts? DAQ dead time tolerance is another question.