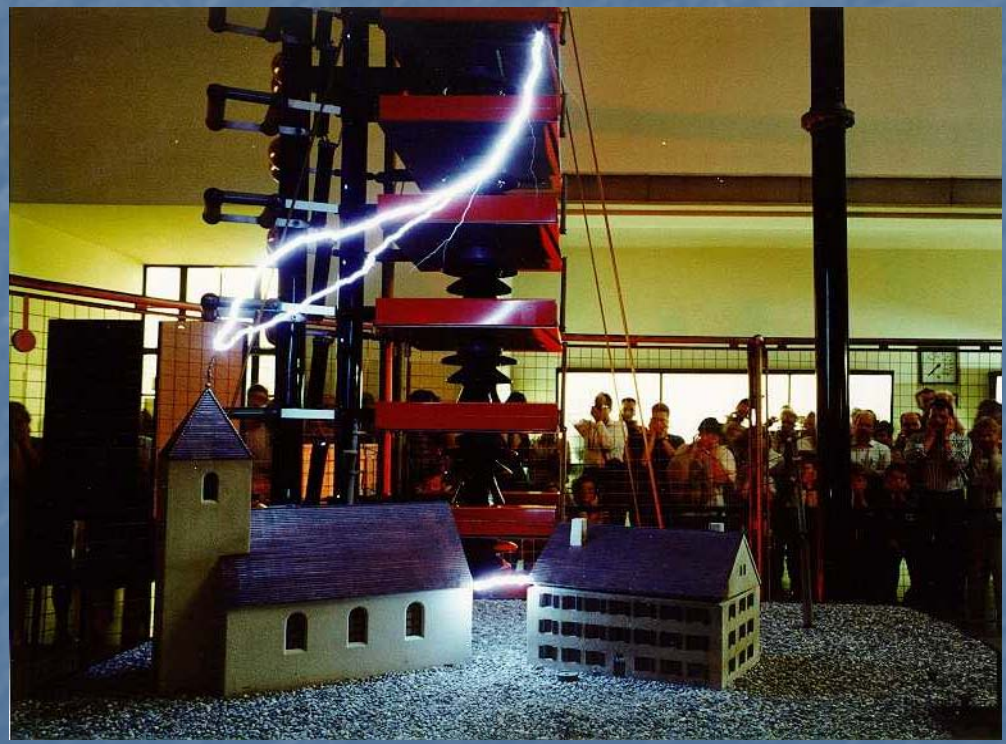
Development and Testing of the ILC Marx Modulator at SLAC

G.E. Leyh, Nevada Lightning Laboratory

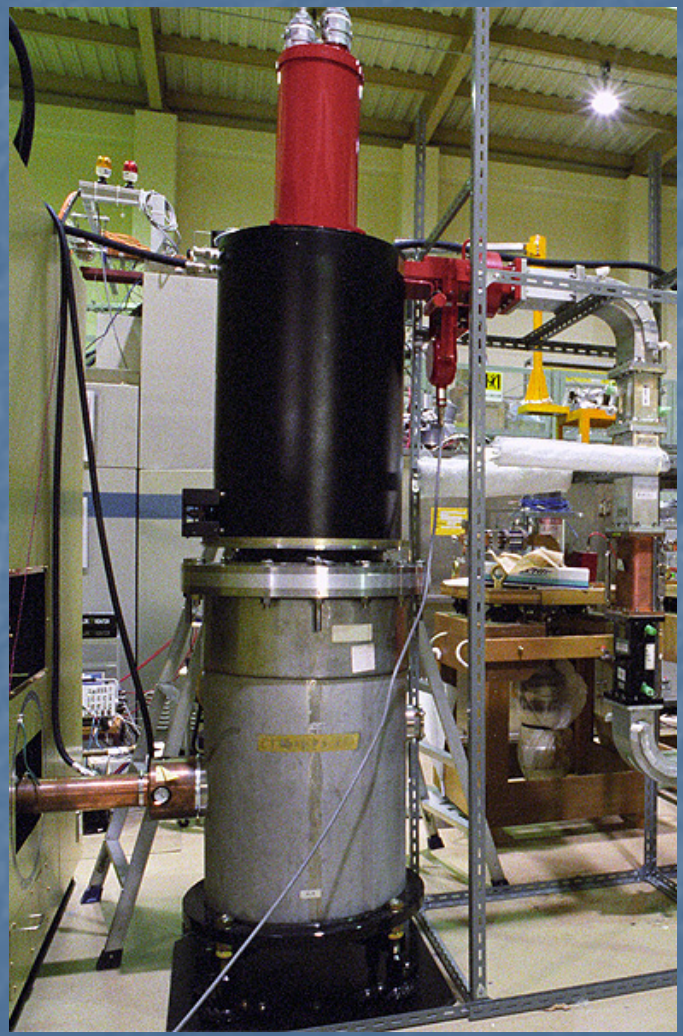


A Marx Bank at the Technical Museum, Munich

ILC Marx Program – Objectives

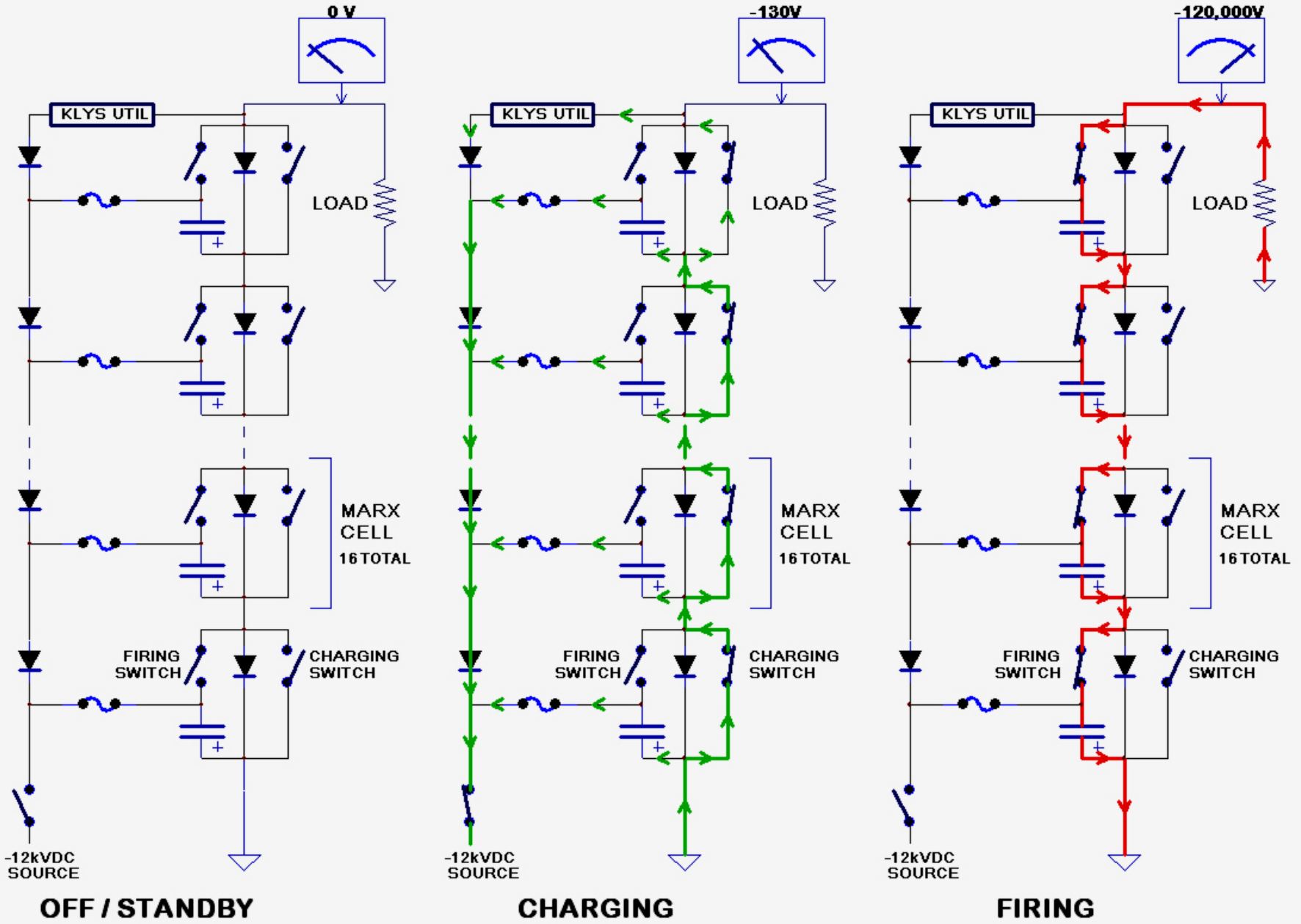
- Explore advantages of Marx approach
  - Oil-free operation
  - Compact mechanical layout
  - Cost-effective PCB ‘step-and-repeat’ design
  - Cellular design increases machine availability
- Construct a ‘Reference Design’ prototype
  - Fast-track program determine overall feasibility
  - Develop cost models
  - Provide power to 10MW klystrons under development
- Encourage participation by industry

ILC Klystron Requirements

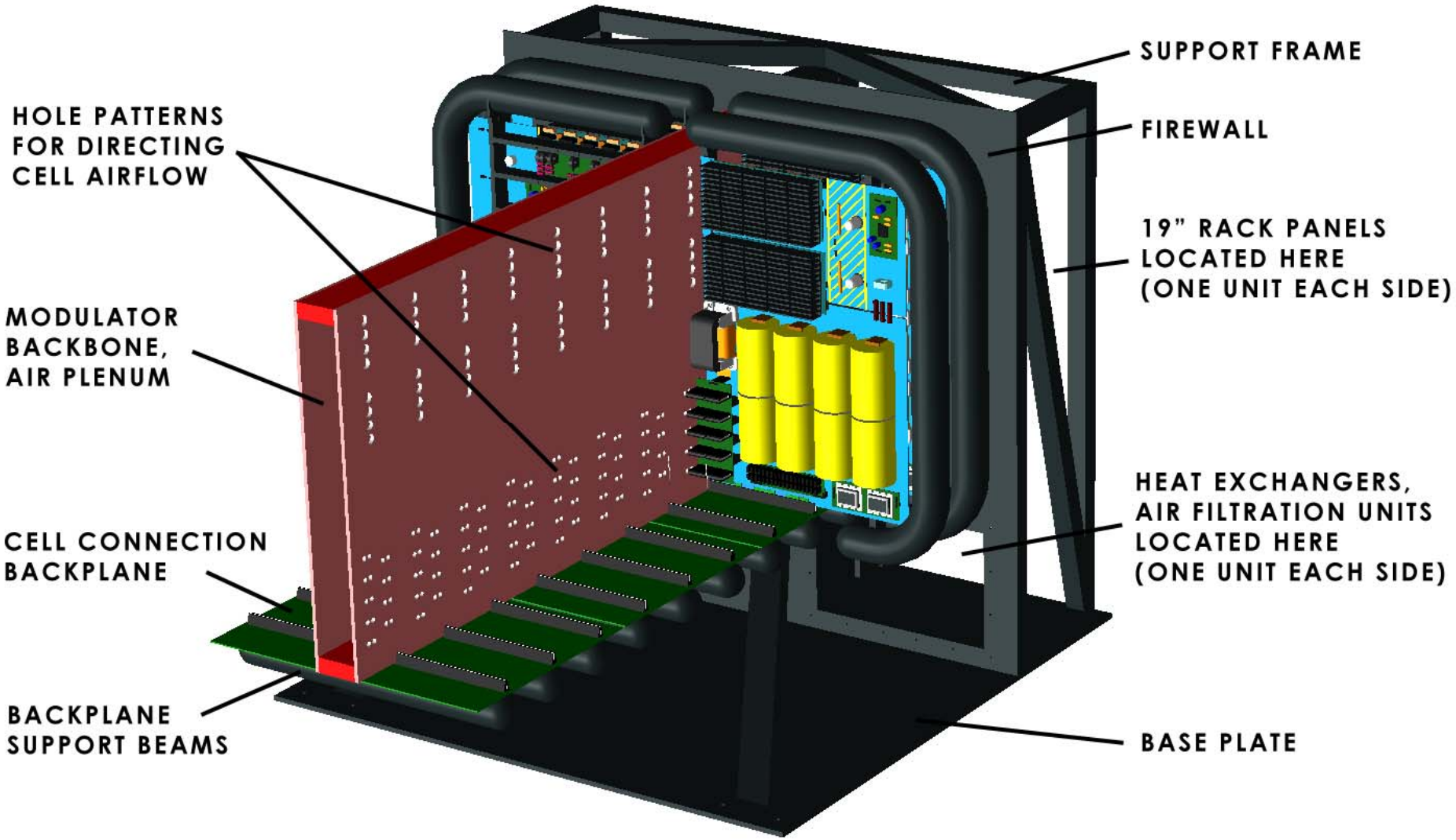


Pulse Voltage	120 kV
Pulse Current	140 A
Pulse Length [flat-top]	1400 usec
Total Pulse Charge	0.2 C
Total Pulse Energy	23,500 J
Repetition Rate	5 Hz
AC Input Power	125 kW
Total # of Stations	576

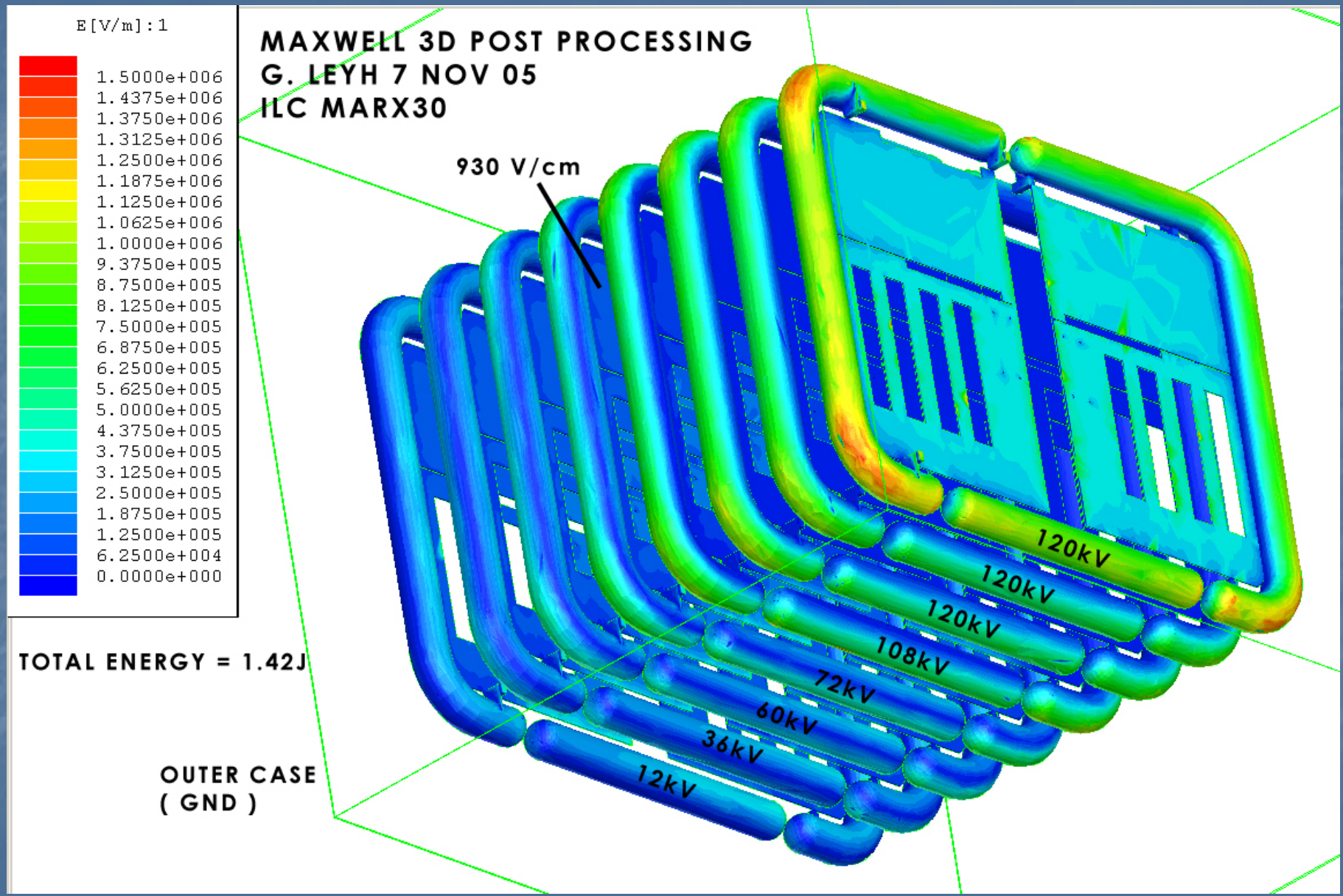
ILC Marx Topology – Basic Modes Of Operation



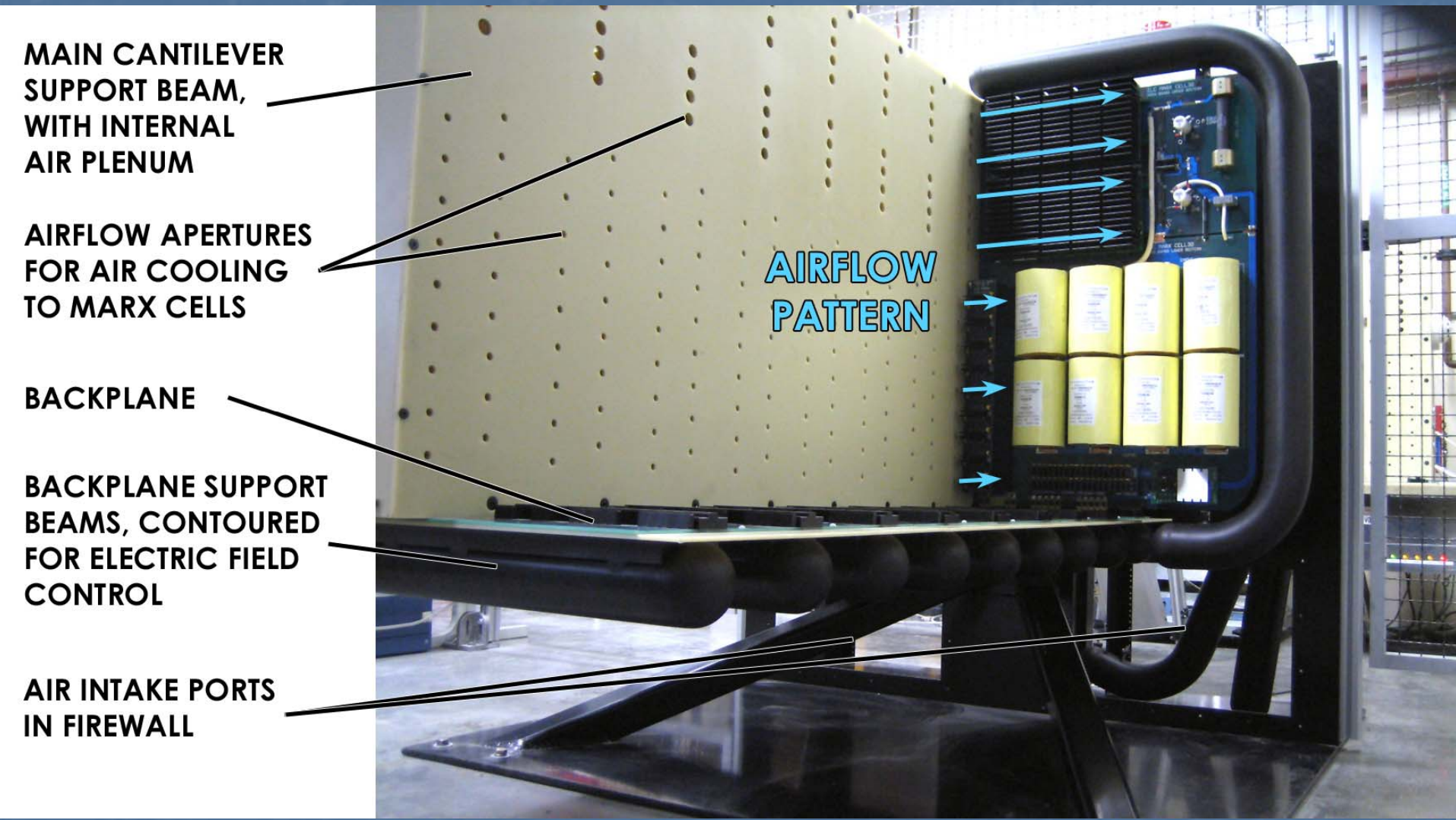
Modulator Core – Physical Layout



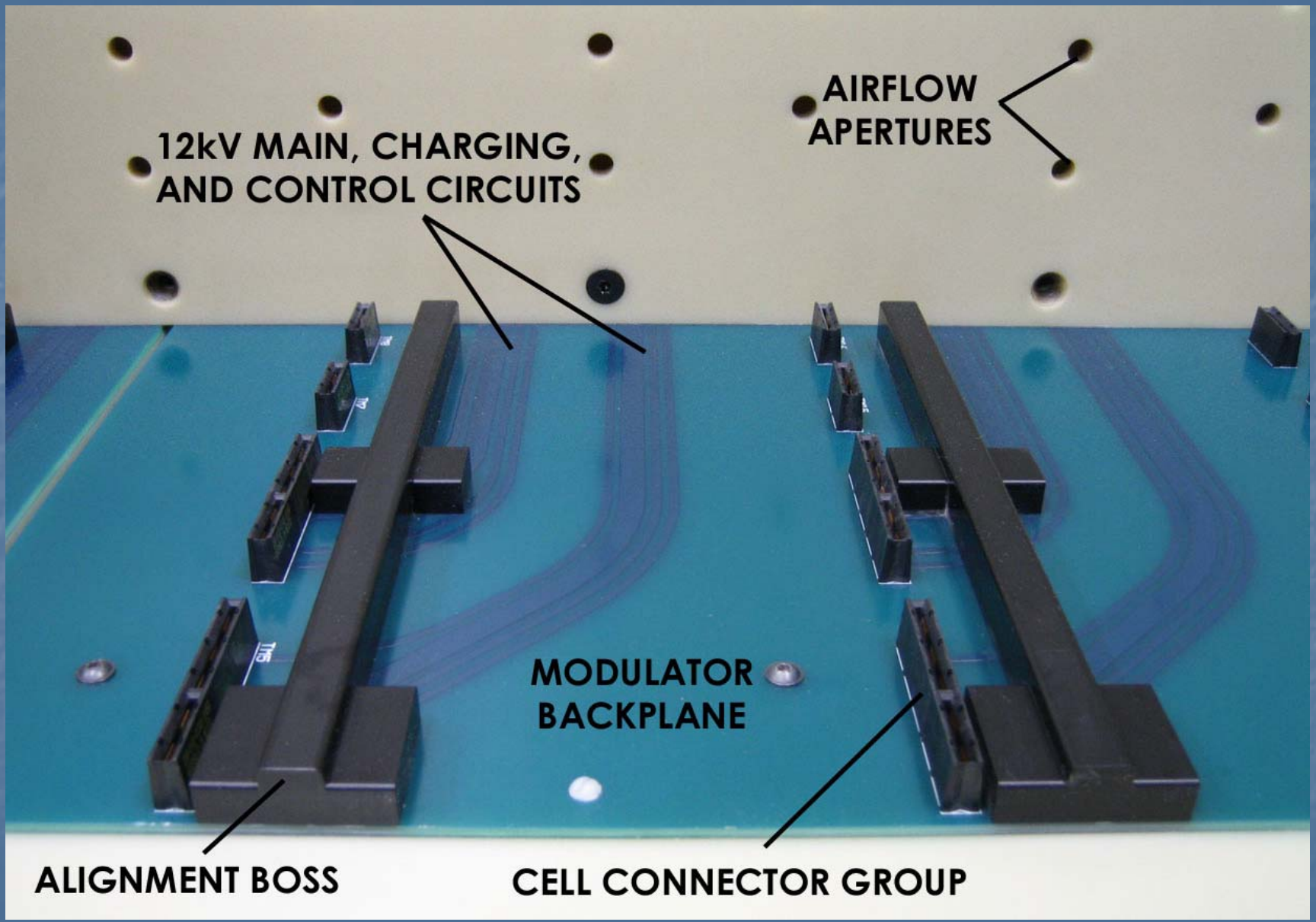
Electric Field Control



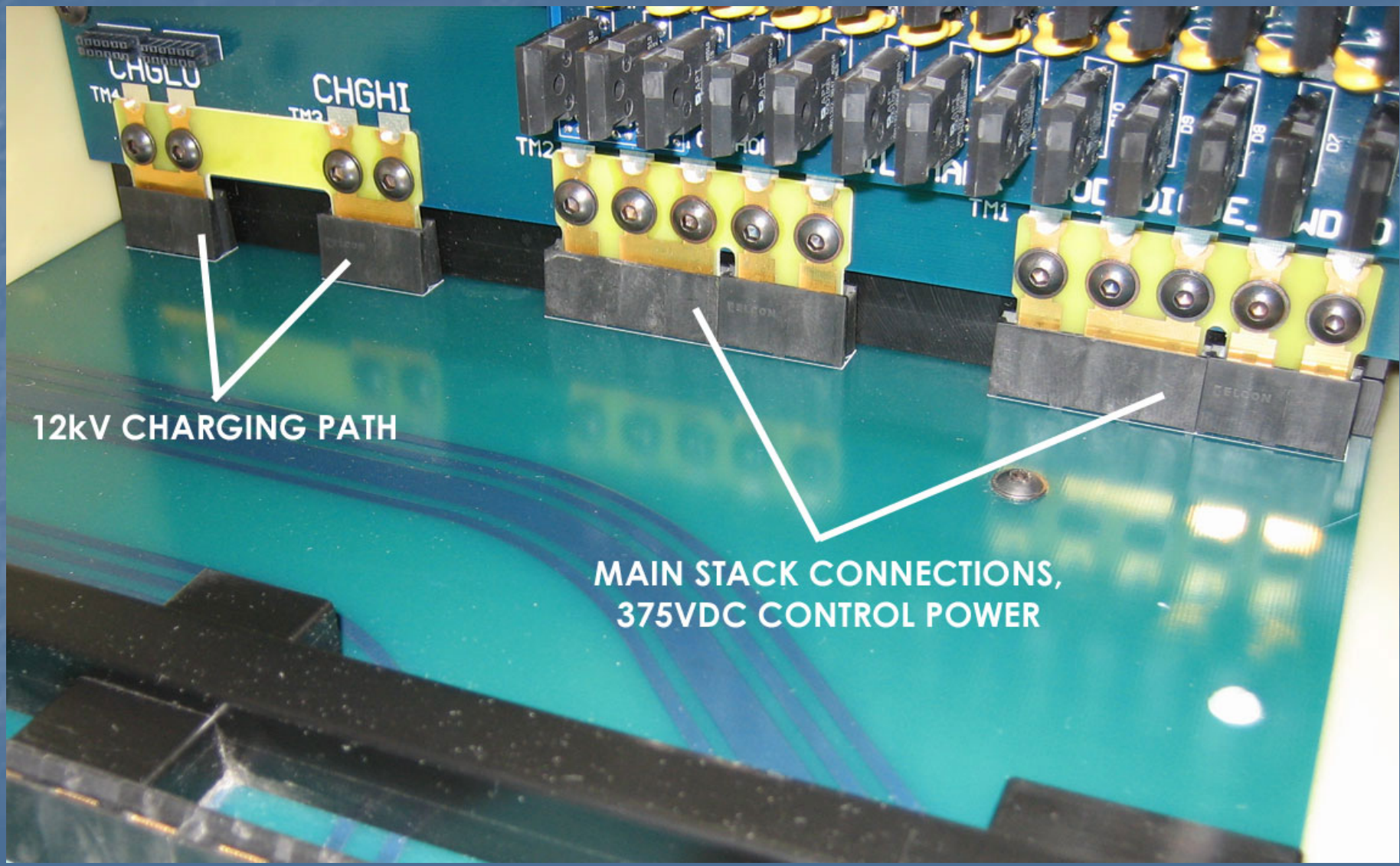
ILC Marx Modulator Prototype



Backplane Detail – Marx Cell Socket



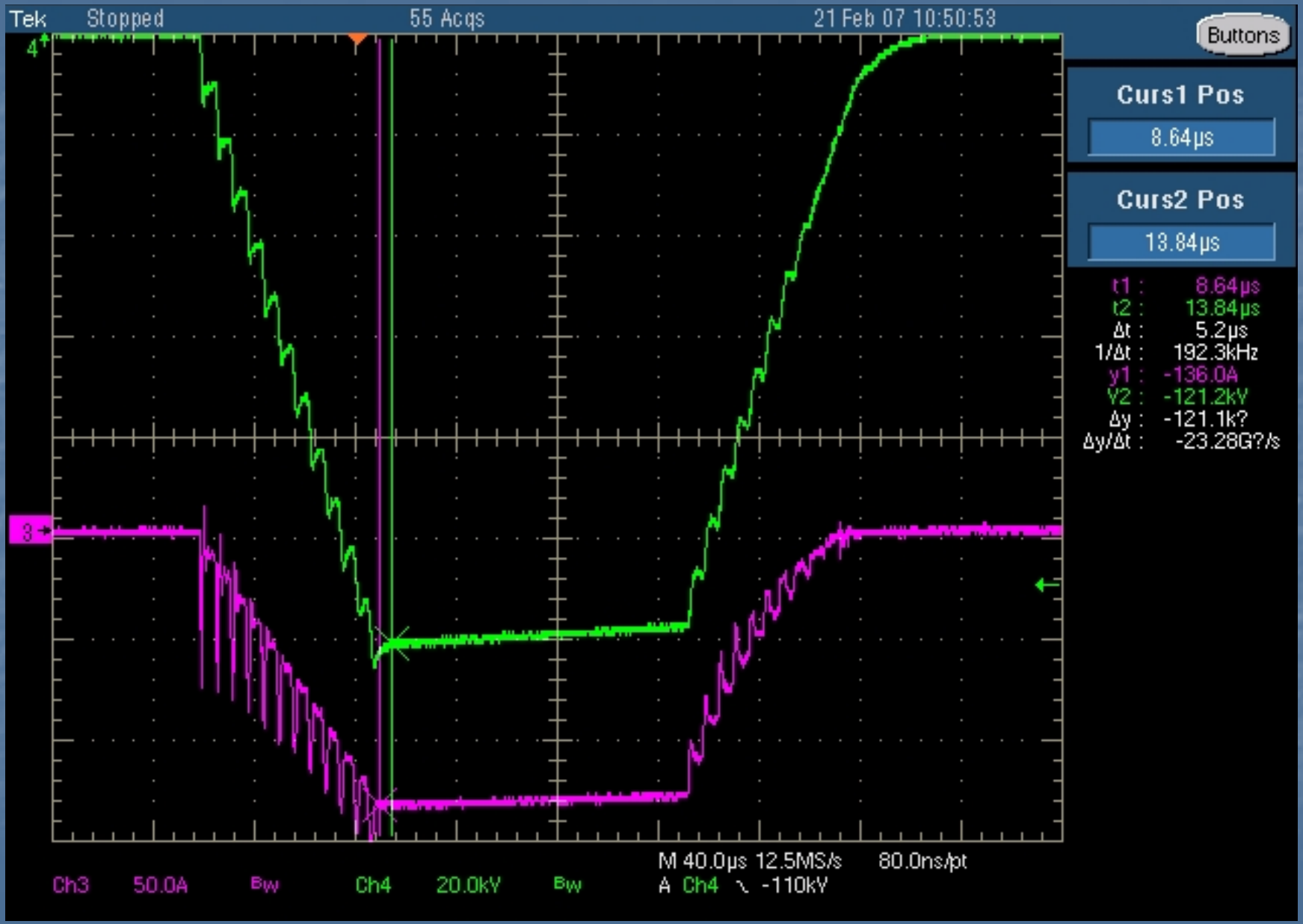
Connections from Cell to Backplane



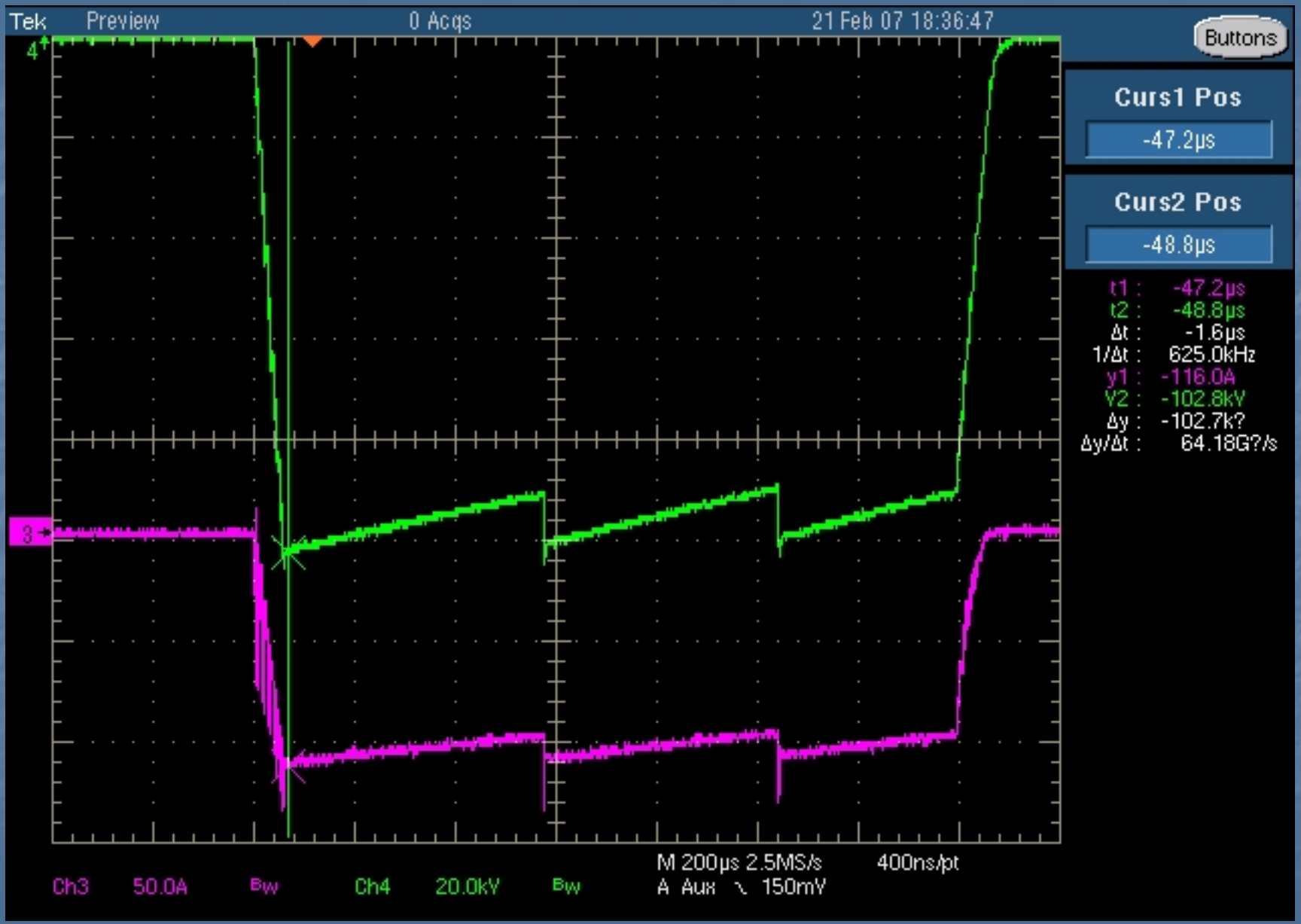
The 12kV Marx Cell

Modulator Test Area

Short-pulse Operation at 120kV, 140A



Long Pulse, with Delayed Cell Leveling



Major Design Contributors

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Craig Brooksby	LLNL
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Howie Pfeffer	FNAL

Industrial Partners

Diversified Technologies	Bedford MA
MK Machine	Oakland CA
ISA Corp	Dublin CA
Standard Metal Products	San Francisco CA

END OF SLIDES