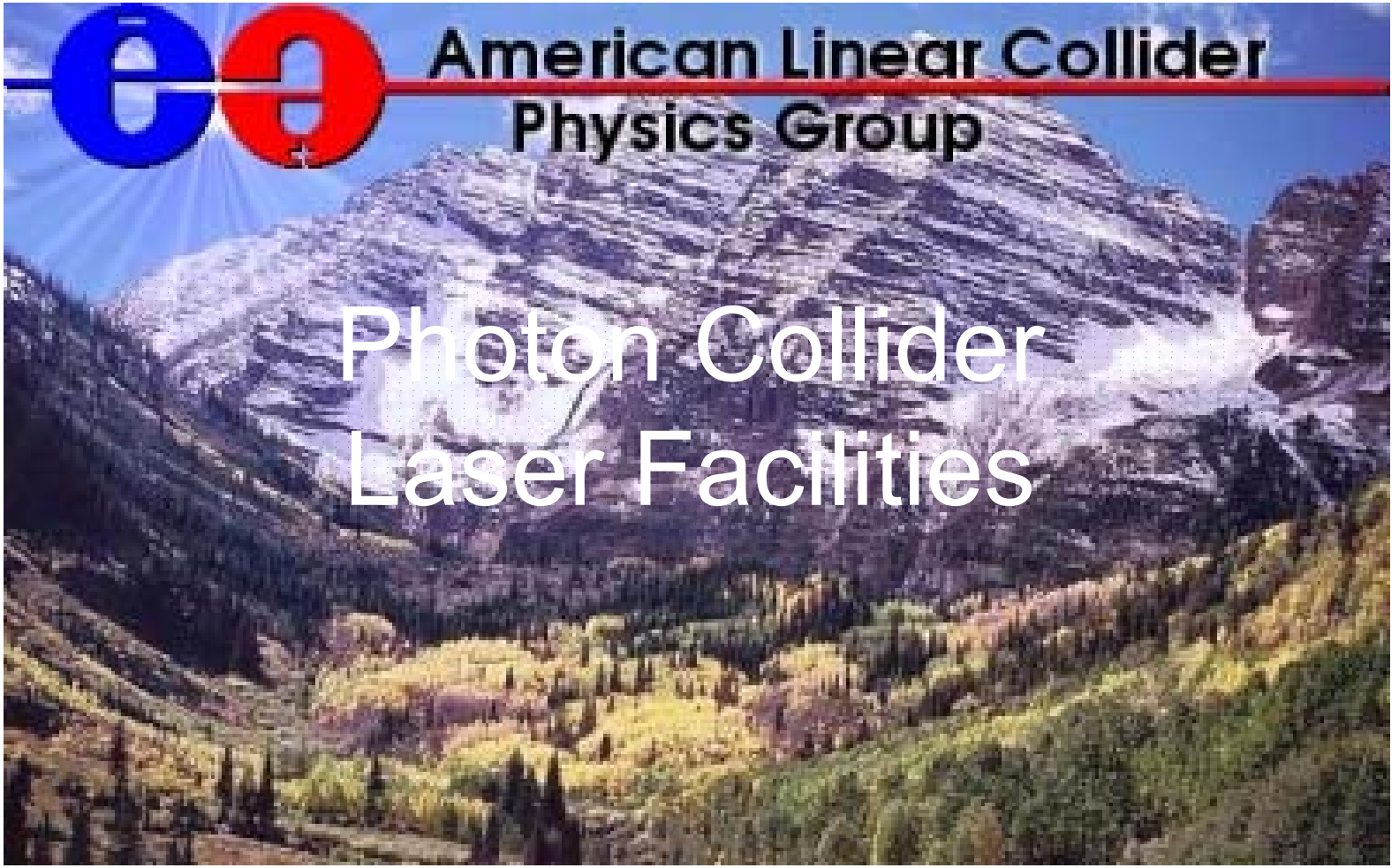

Jeff Gronberg / LLNL

August 16, 2005

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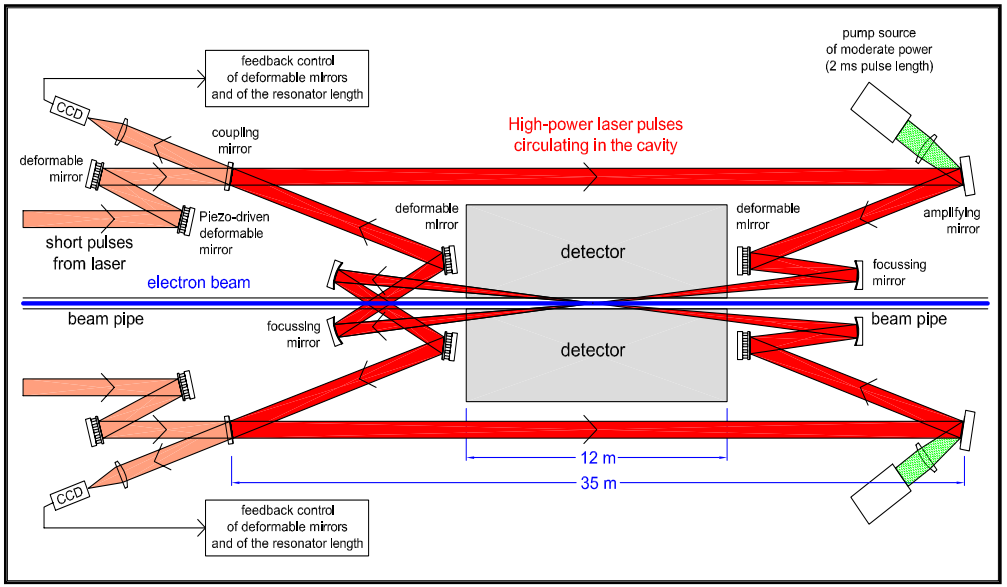
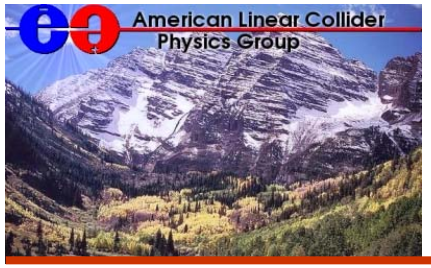
Desy-Zeuthen / MBI Cavity requires a laser to provide the drive pulses



- Laser requirements:
  - 1000+2820 pulses/train
  - 337 ns separation
  - 5 Hz operation
  - 40 mJ per pulse
  - Picosecond pulse
  - Wavefront quality?
  - Timing jitter?

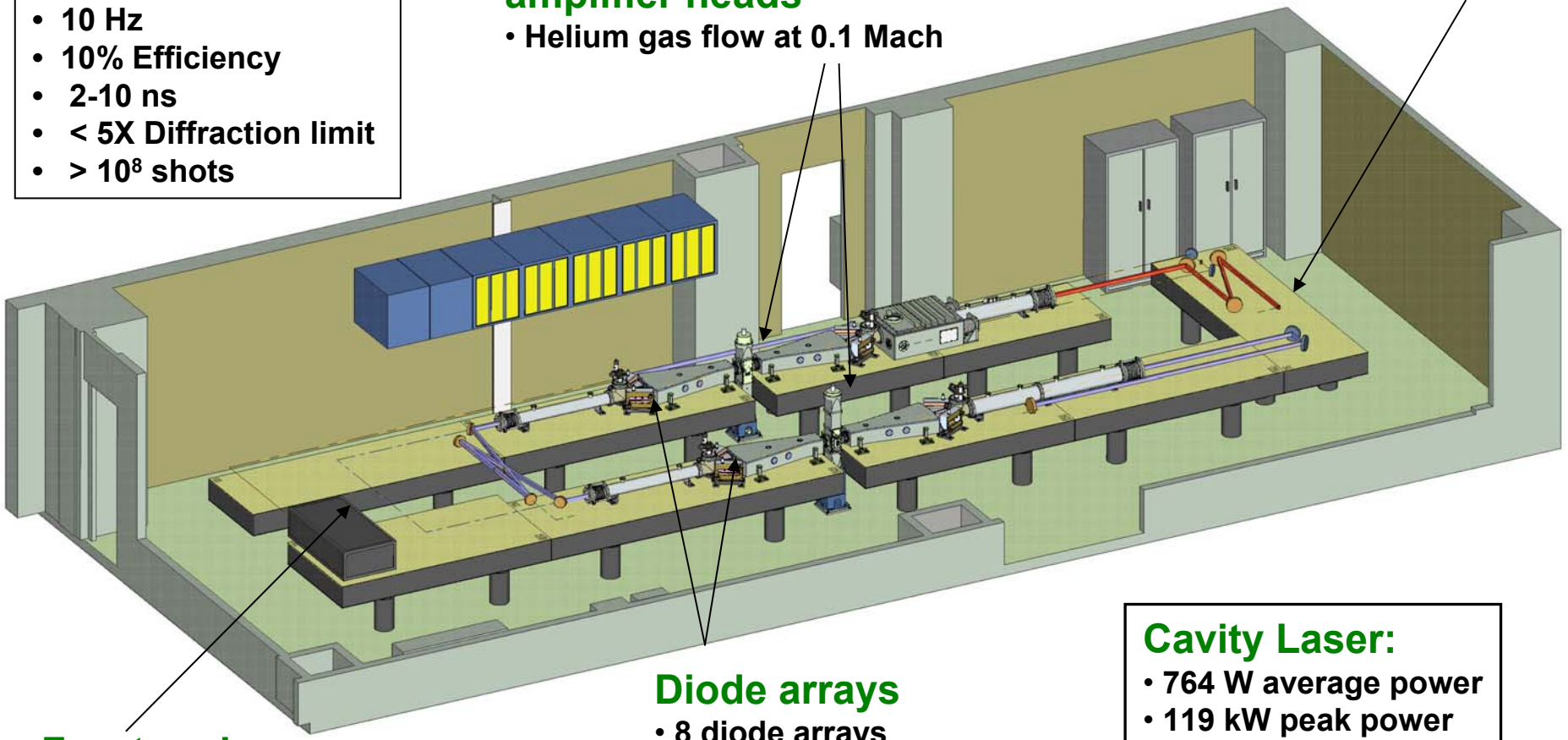


The MERCURY laser is a current high average power laser, 1000W average power

Goals 2 amps:
- 100 J
- 10 Hz
- 10% Efficiency
- 2-10 ns
- < 5X Diffraction limit
- > 10^8 shots

Gas-cooled amplifier heads
- Helium gas flow at 0.1 Mach

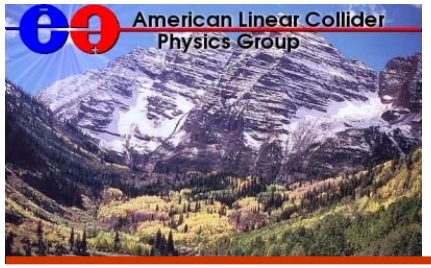
Output



Front-end
- 300 mJ

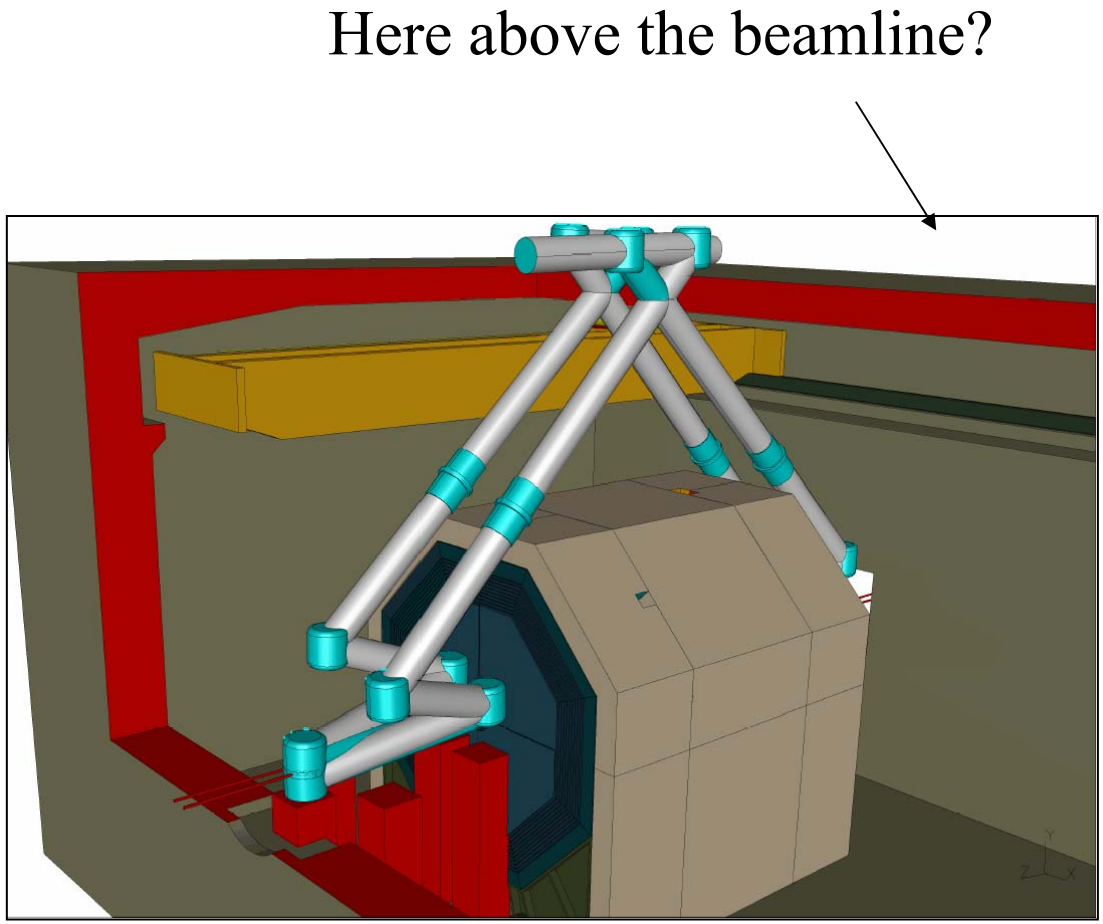
Diode arrays
- 8 diode arrays
- 6624 diodes total
- 730 kW peak power

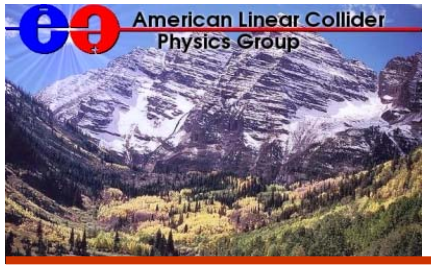
Cavity Laser:
- 764 W average power
- 119 kW peak power



IR hall needs space for the laser facility close to the cavity

- Probably needs to hold 2+ Mercury size lasers
- Should be close to the cavity
  - Control room upstairs
  - Maintenance facilities in the pit





Conclusions

- Laser seems within range of current parameters, but
  - Real design from real laser physicists is necessary
  - Timing and wavefront quality must be specified
- A system of 2 lasers + 1-2 spares is necessary for operations
  - Lasers should be Order(10M) each
- Space in the cavern for a clean room (10mx30m?)
- Operations consoles upstairs