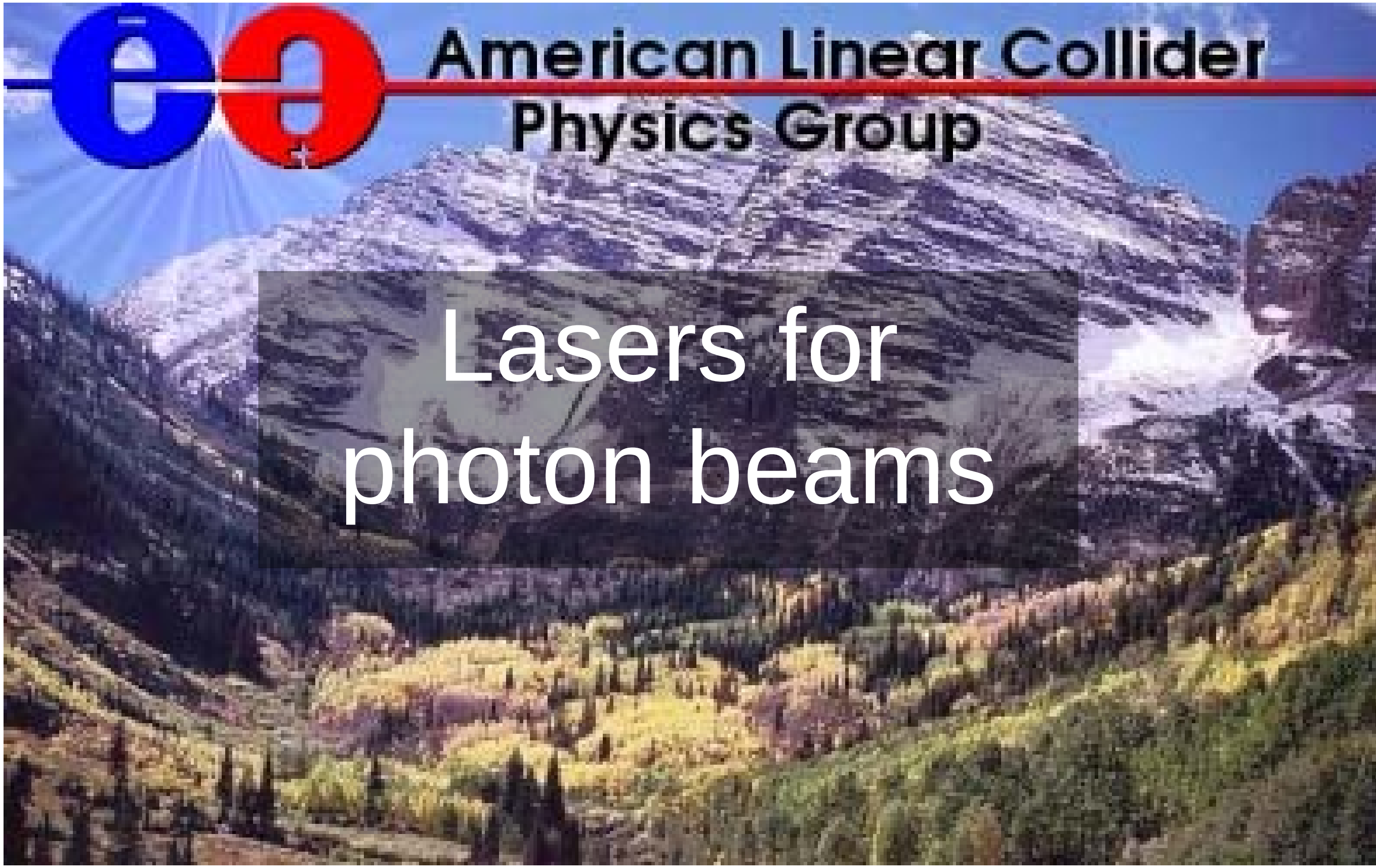

Jeff Gronberg / LLNL

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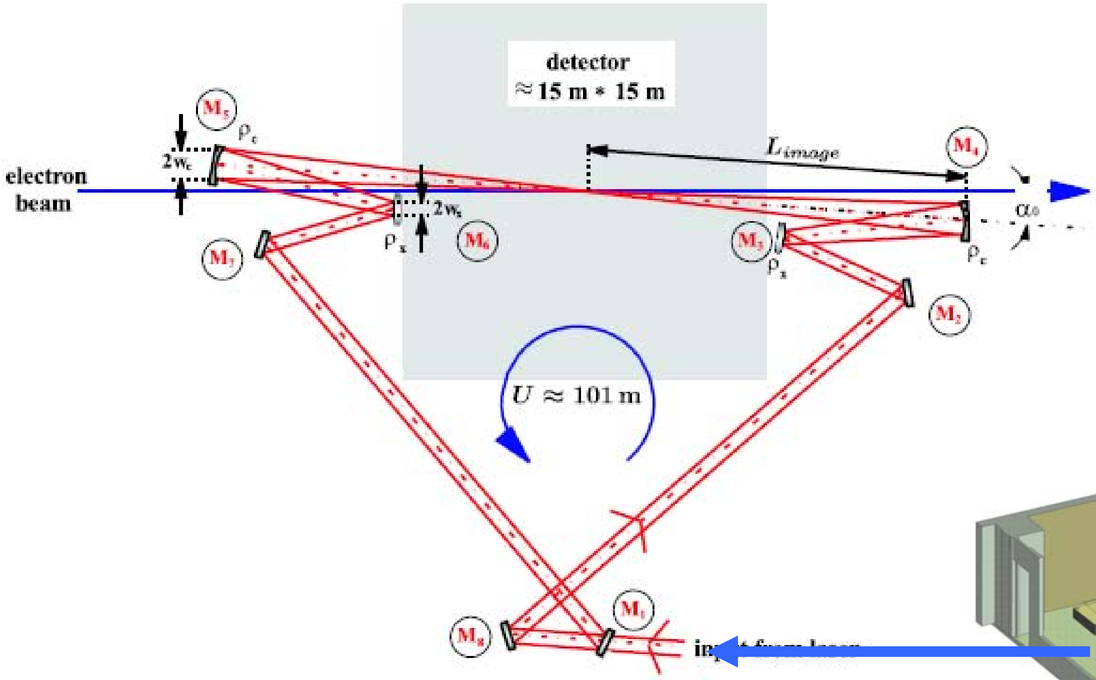
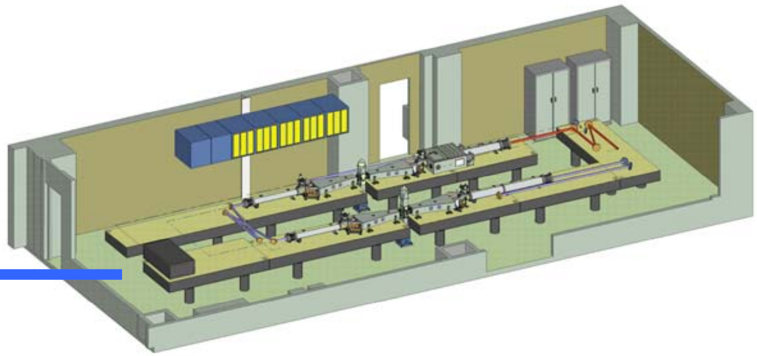
Photon Collider is trying to reach ~100% Compton conversison rate

Stacking cavity is designed to reach 9J per bunch



G. Klemz et al.

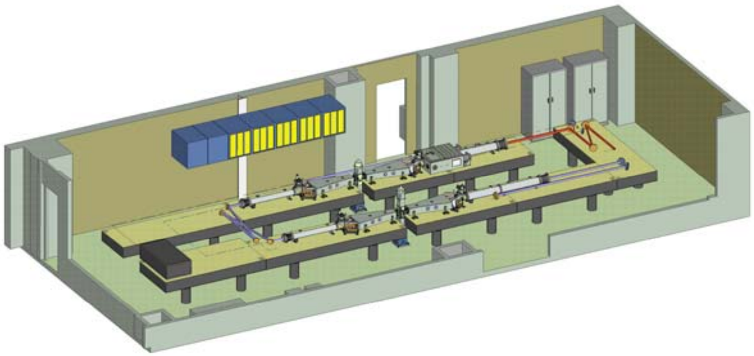
Laser source puts out a train of bunches with 40mJ / pulse



Laser requirements for photon beams are similar to $\gamma\gamma$ but much lower power

- A laser that can produce a 2820 train of pulses at 5Hz is needed, but…
  - Conversion factor (γ/e) is much smaller - 1.0e-4
  - This corresponds to pulse energy of Order(1mJ)

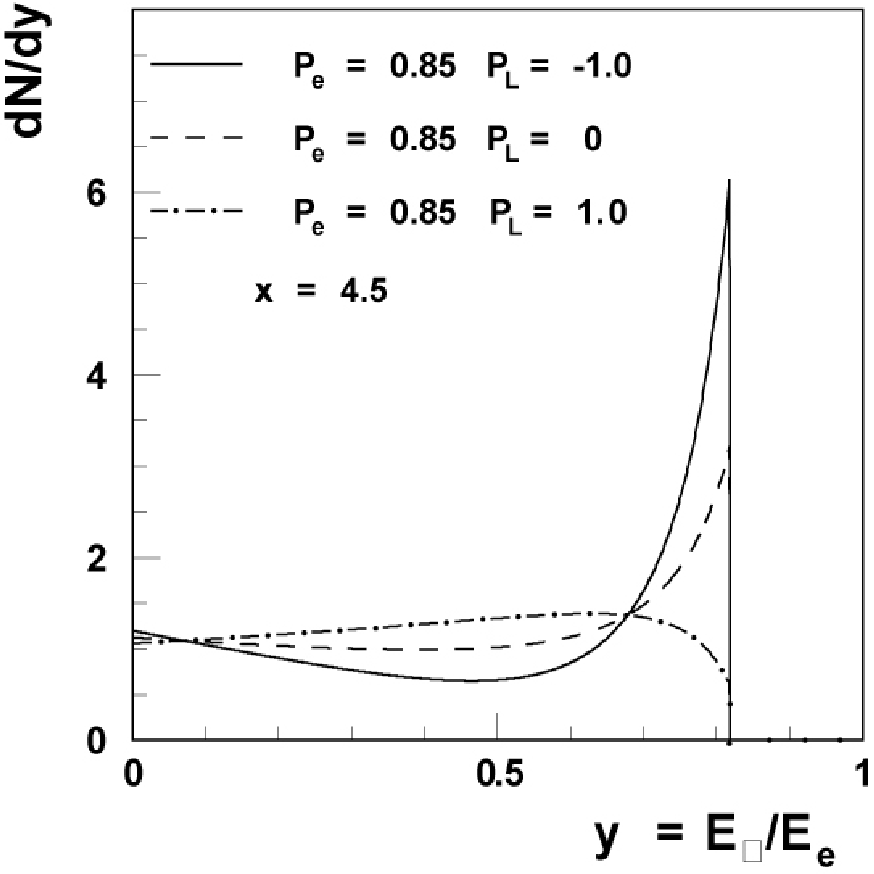
The cavity is not required,
The $\gamma\gamma$ laser is overkill



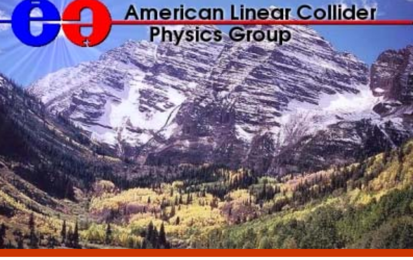
At 1mJ other laser architectures are possible.
My opinion is that the laser is not a show stopper.

Energy distribution is peaked but extends down to zero

- The required energy spread must be defined by the experiment.
- For collimation of low energy photons to work the angular distribution of electrons at the focus must be less than 1/γ
  - A large beta function will limit the spot size
  - If the spot size goes above 10 microns then the laser spot size and power will need to be increased.



A. Zarnecki



Conclusions

- Laser doesn’t seem to be a show-stopper
  - Power is low, many architectures are possible
  - Final design of interaction point is required before final power can be specified

- Beam optics design is needed so that we know the particle distribution at the interaction point

- Some games can be played
  - Use 1% bunch charge parasitic beam with increased laser power to compensate
  - Use post-IP beam and focus only the core to a small point, ignore the scattered particles
  - There are many ways to get 10^6 photons / bunch, a system optimization needs to be done