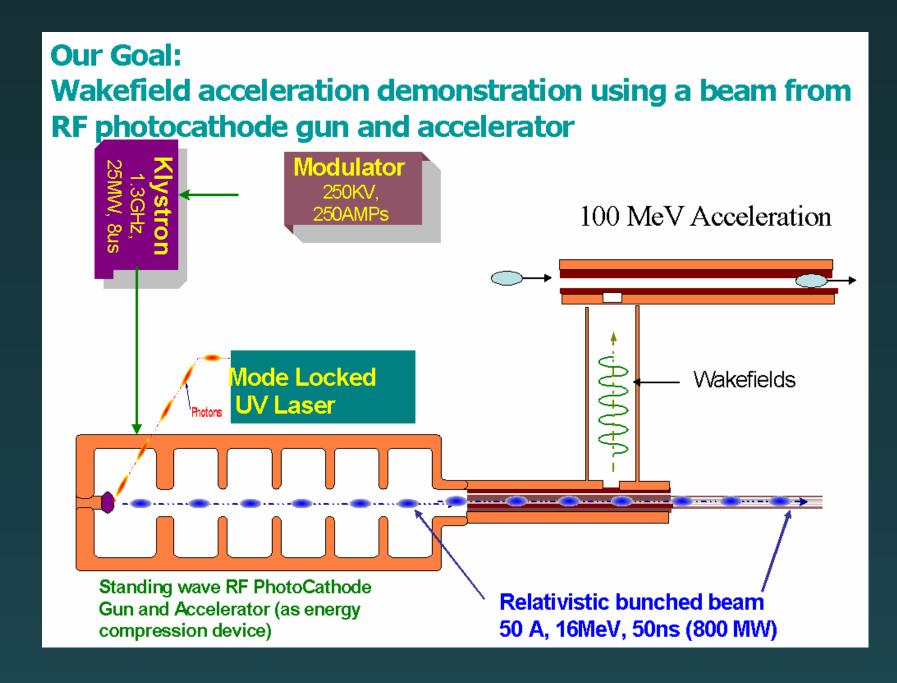
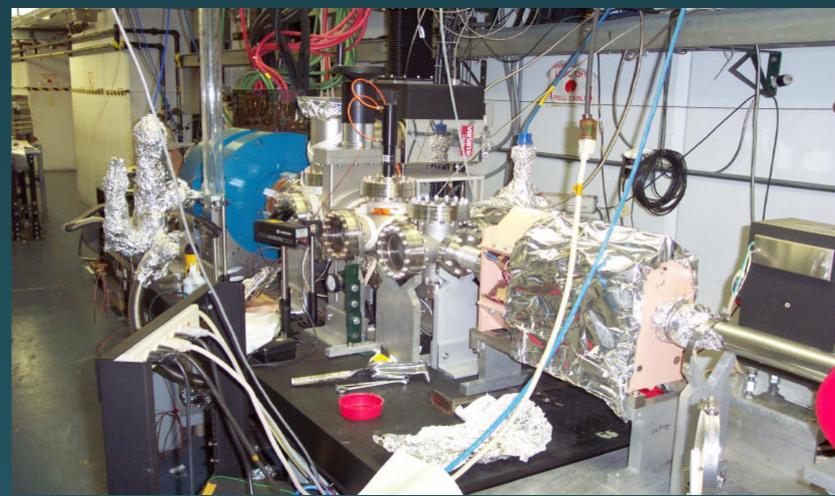
Wakefield Accelerator Drives Tomorrow's High Energy Physics Research High Energy Physics Division, Argonne National Laboratory

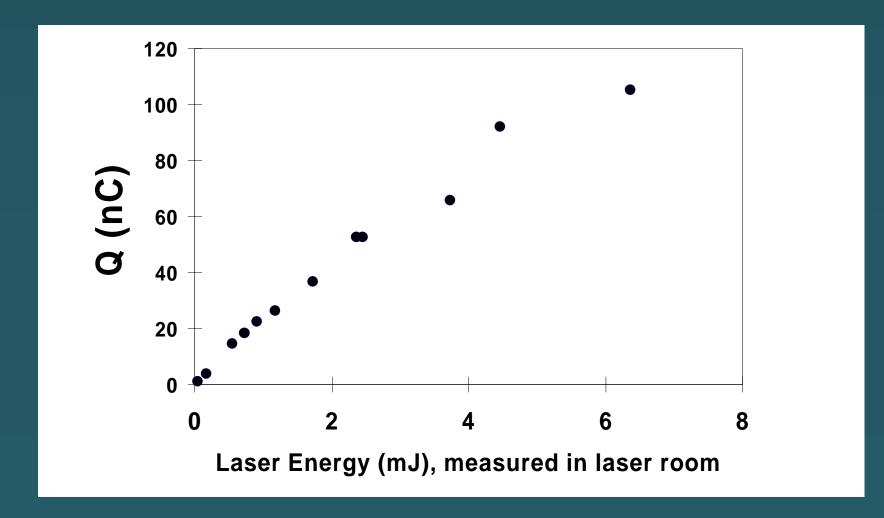


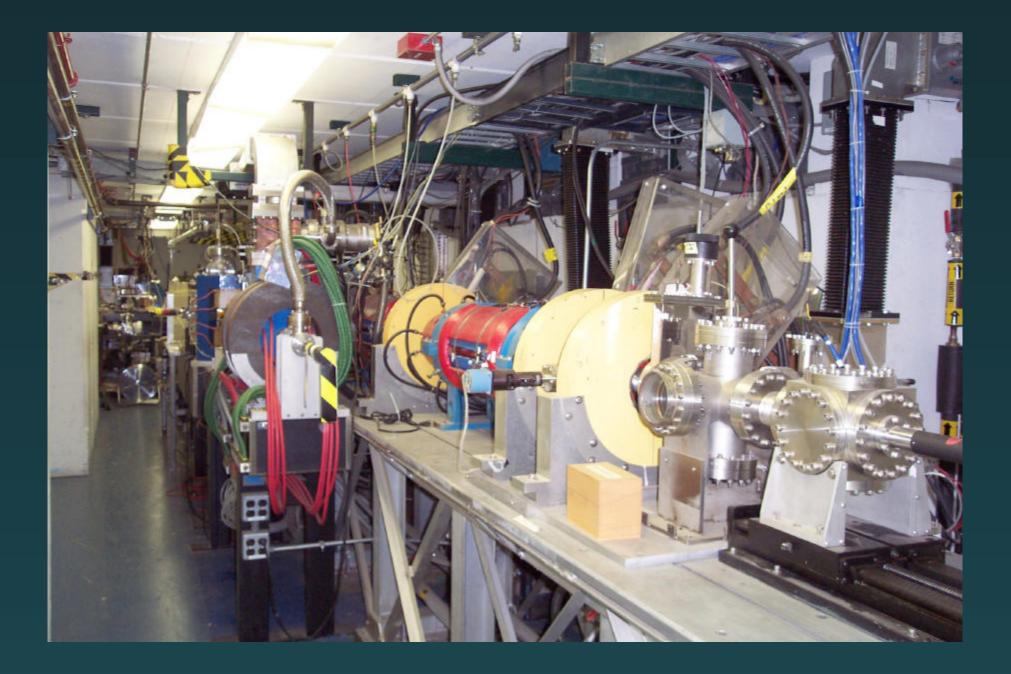
www.hep.anl.gov/awa



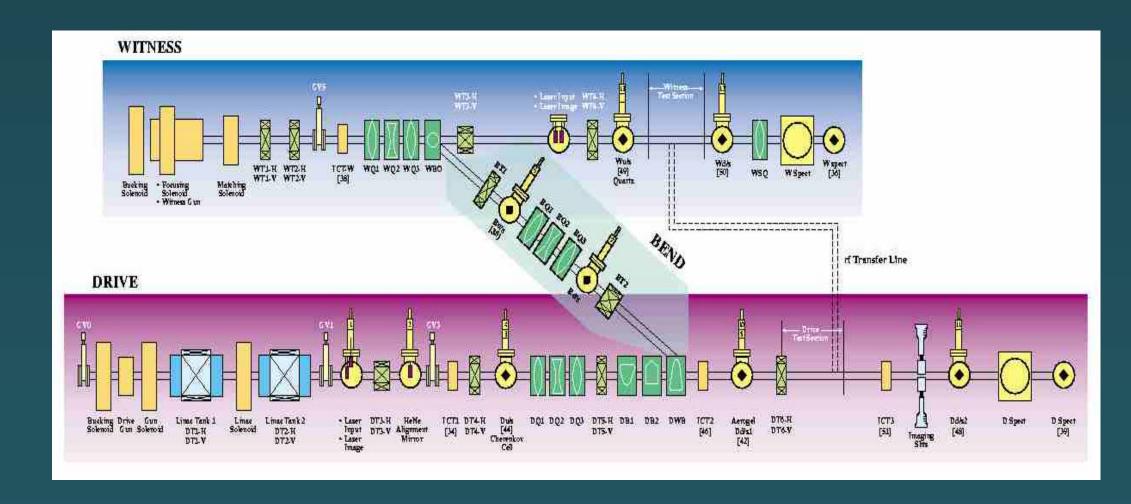


New electron gun produced a world record high current electron beam





AWA beamline and layout



- Invented the direct wakefield measurement technique.
- First Ever Direct Wakefield
 Acceleration with Data on Dielectric
 Structures, Metallic Structures,
 Plasmas
- First Ever wakefields measurement of a detuned-SLAC NLC structure.
- **Invented** the two-RF gun wakefield facility.
- First ever 100 nC RF photocathode gun and Linac.
- First ever Plasma wakefield acceleration in underdense regime (non-linear) (with UCLA).
- First ever Dielectric based two beam acceleration experiment.
- Experimentally studied multi-moded dielectric wakefield structure.
- Development of dielectric based acceleration structures, such as step-up transformer, RF generation, travelling wave accelerator.
- Multiple drive beam generation and its applications to dielectric two beam acceleration and multidrive beam collinear wakefield accelerations.

Looking Forward:

- Demonstrate high current electron pulse and RF generation at 7.8 GHz; Demonstrate
 high power RF generation ~ 30 100 GHz, power ~ 100 MW GW range with pulse length
 of ~ 10 ns. (Critical for future linear colliders development.)
- Demonstrate high gradient and sustained acceleration. Dielectric breakdown test and accelerate a 1 nC beam to 100 MeV.