

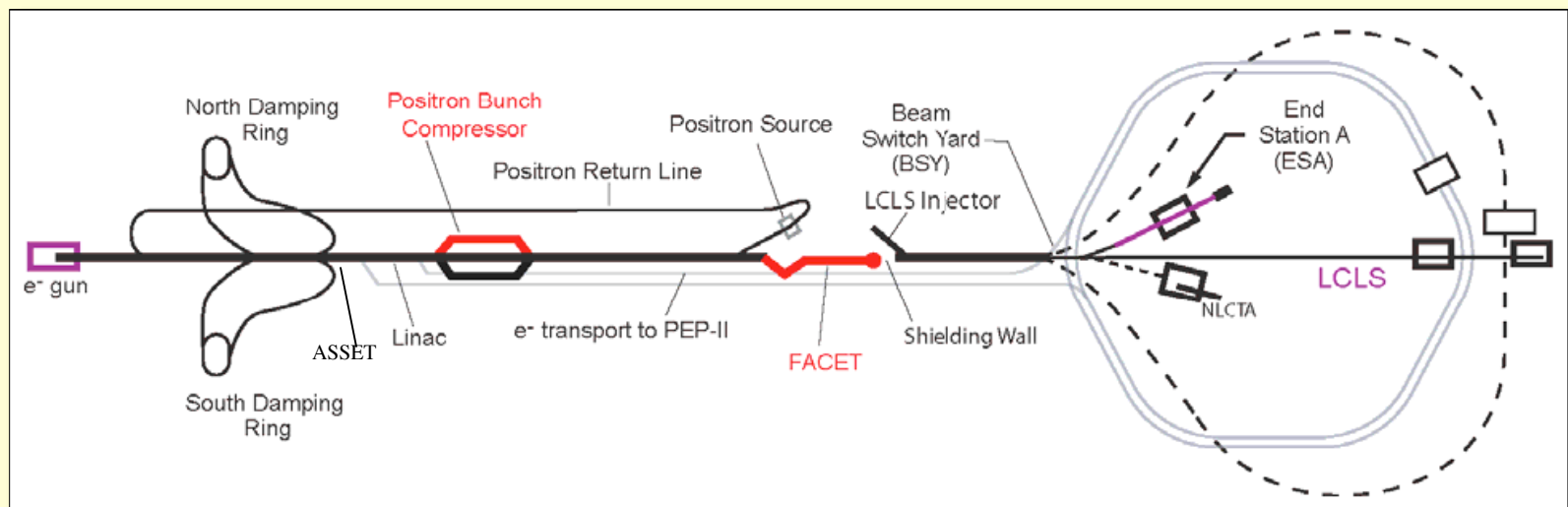
U. Wienands, SLAC

Head, S0-20 Division

- FACET, Sec. 20, dedicated linac beam
- ESTB, ESA, LCLS beam
- NLCTA, 0.5 GeV, dedicated accelerator
- ASSET, ≈ 2 GeV, Sec. 2, long (1.5 mm) bunches

	FACET	ESA (ESTB)
Energy	23 GeV	4 – 13.6 GeV
Charge per pulse	$0.5 - 2.0 \times 10^{10} e^-$ or e^+	$0.15 \times 10^{10} e^-$
Pulse length at IP (σ_z)	15 – 40 μm	100 μm (44 μm)
Typical spot size at IP ($\sigma_{x,y}$)	10 – 20 μm	$\gamma\varepsilon = 4$ pm-rad by 1 pm-rad
Repetition rate	1 – 30 Hz	1 Hz (?)
Momentum spread	4 – 0.5%	0.06 – 0.02% (?)
Momentum dispersion at IP	$\eta < 10^{-5} \text{ m}$	0 (?)

- Driven by first 2/3rd of the SLAC 2-mile linac
 - new exp. area in Sec. 19-20.
 - new compressor chicane in Sec. 10 for e^+
 - new compressor chicanes in Sec. 19.
 - e^- and slightly later also e^+

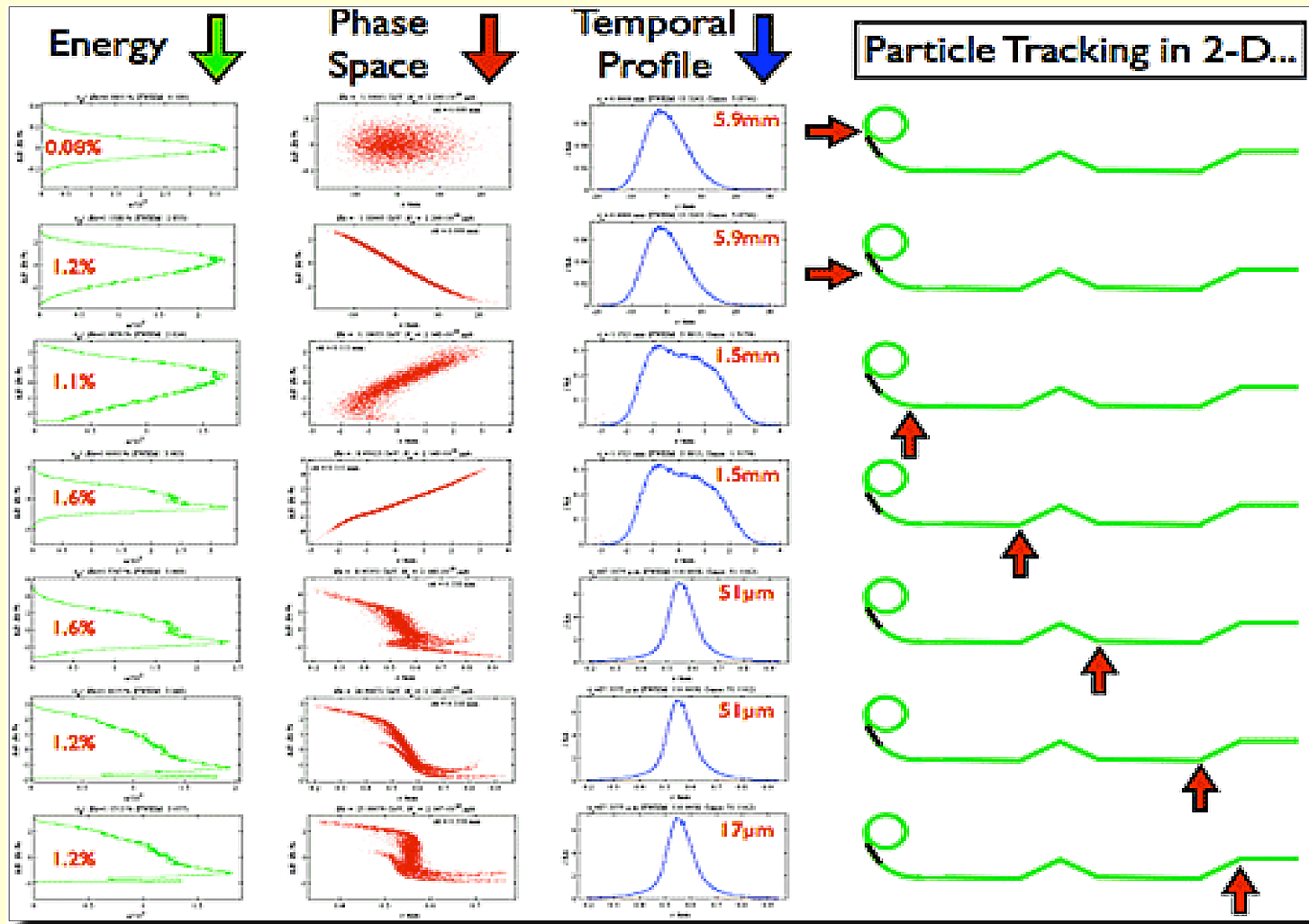


- Beam Parameters (typical):

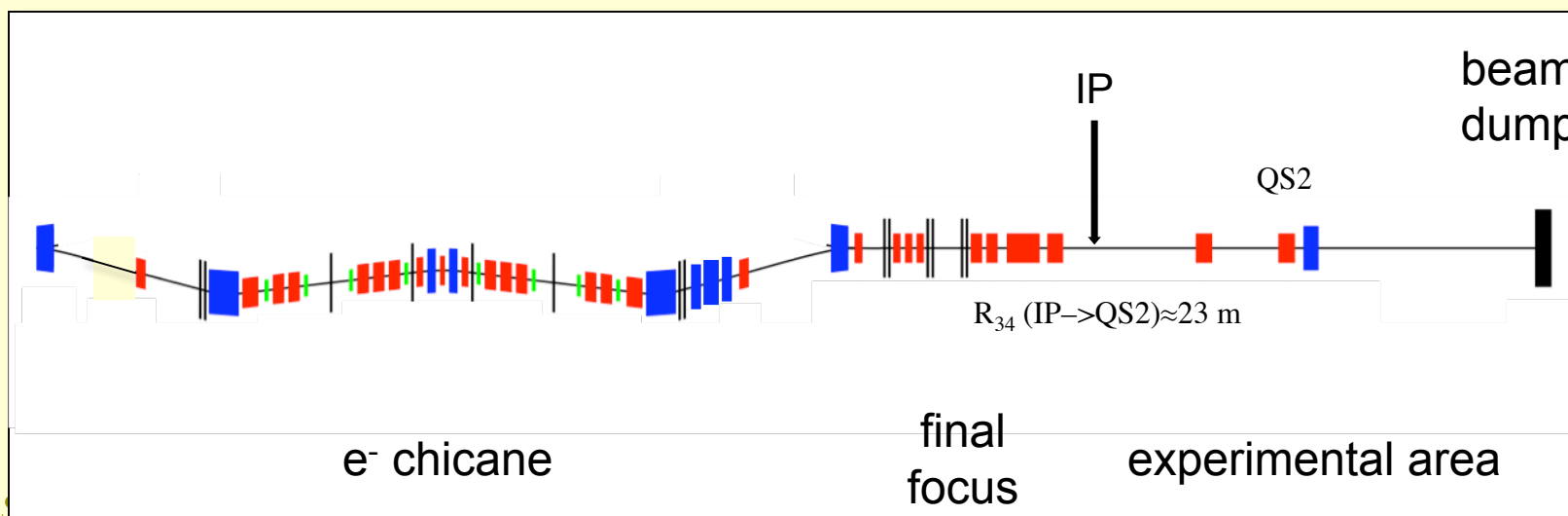
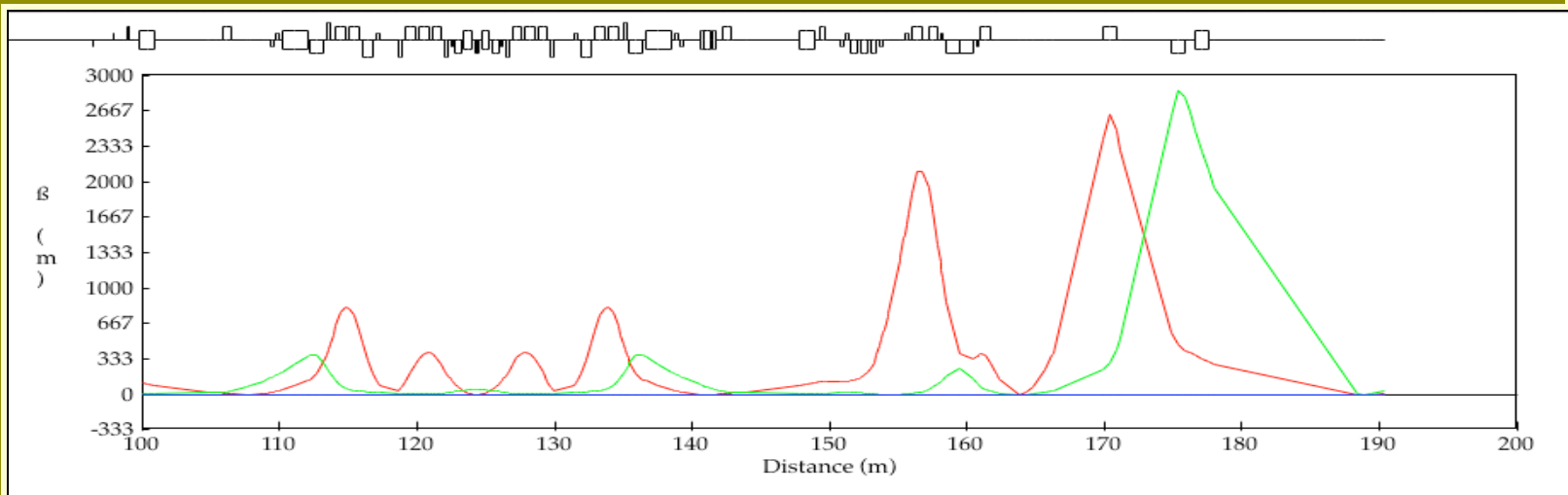
Energy	23 GeV
Charge per pulse	$0.5 - 2.0 \times 10^{10} e^-$ or e^+
Pulse length at IP (σ_z)	15 – 40 μm
Typical spot size at IP ($\sigma_{x,y}$)	10 – 20 μm
Repetition rate	1 – 30 Hz
Momentum spread	4 – 0.5%
Momentum dispersion at IP (η and η')	$\eta < 10^{-5} \text{ m}$

- many of these can be tuned to match requirements
- 30 Hz repetition rate

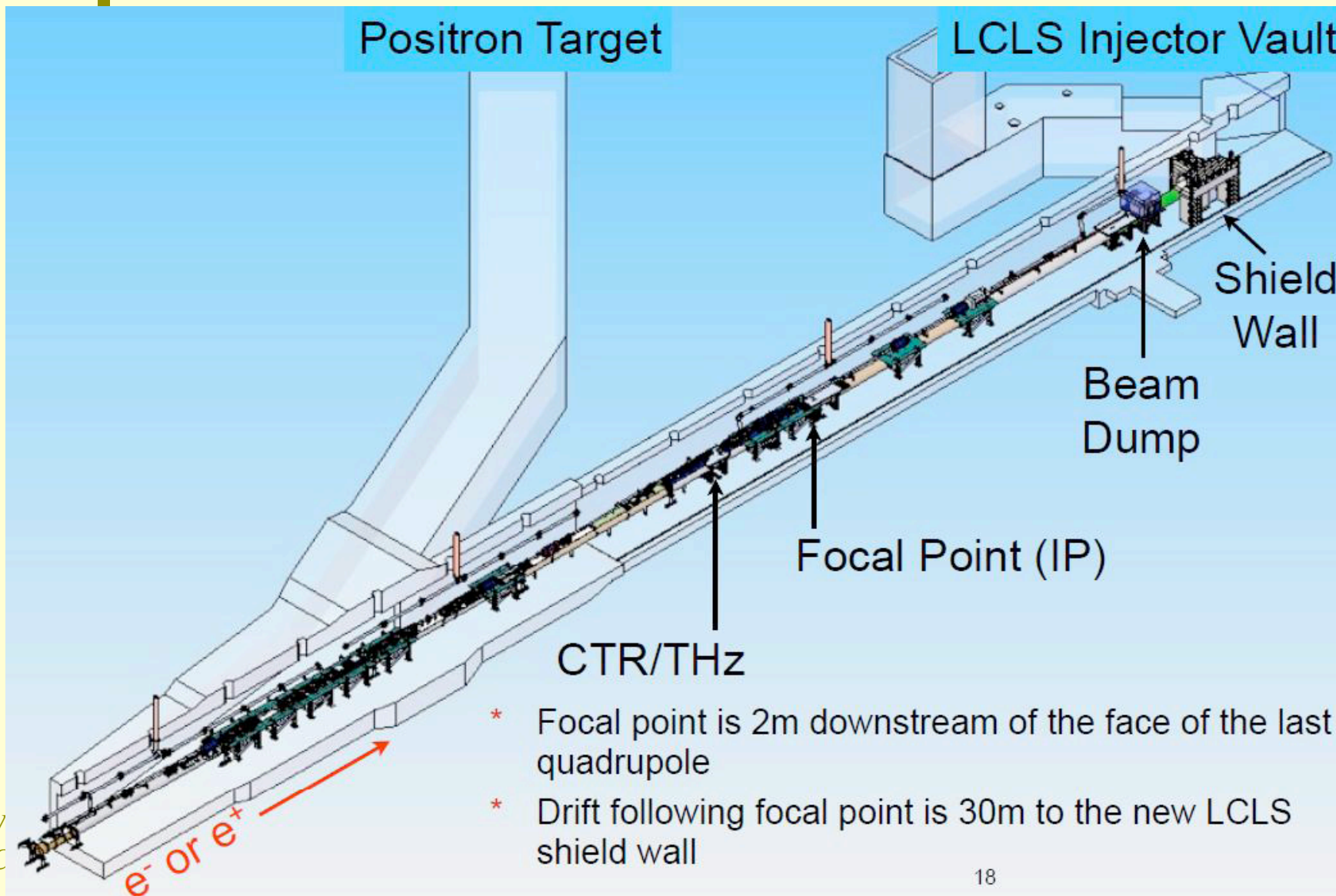
Staged Bunch Compression



S20 Optics & Layout

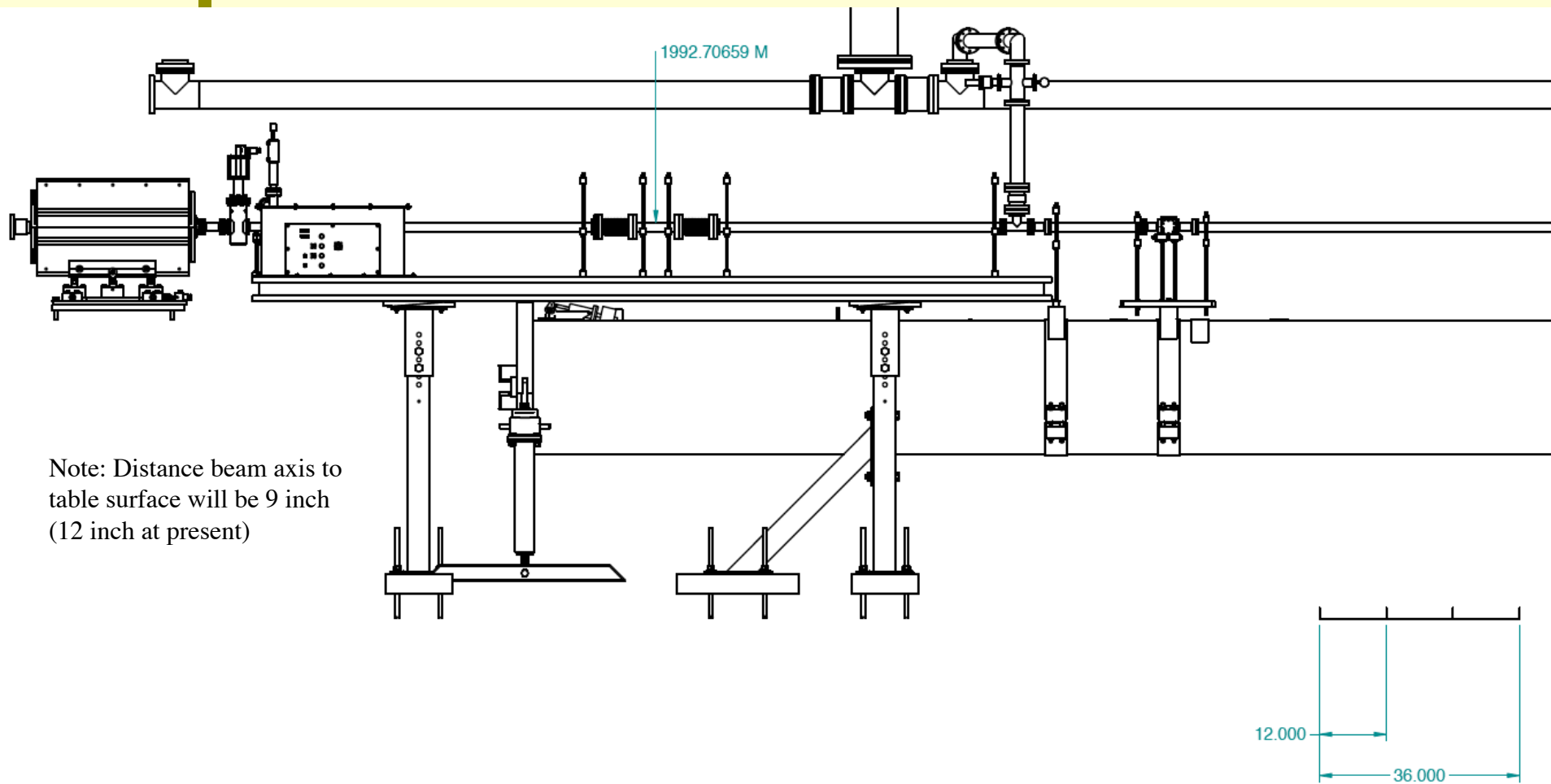


S20 Model



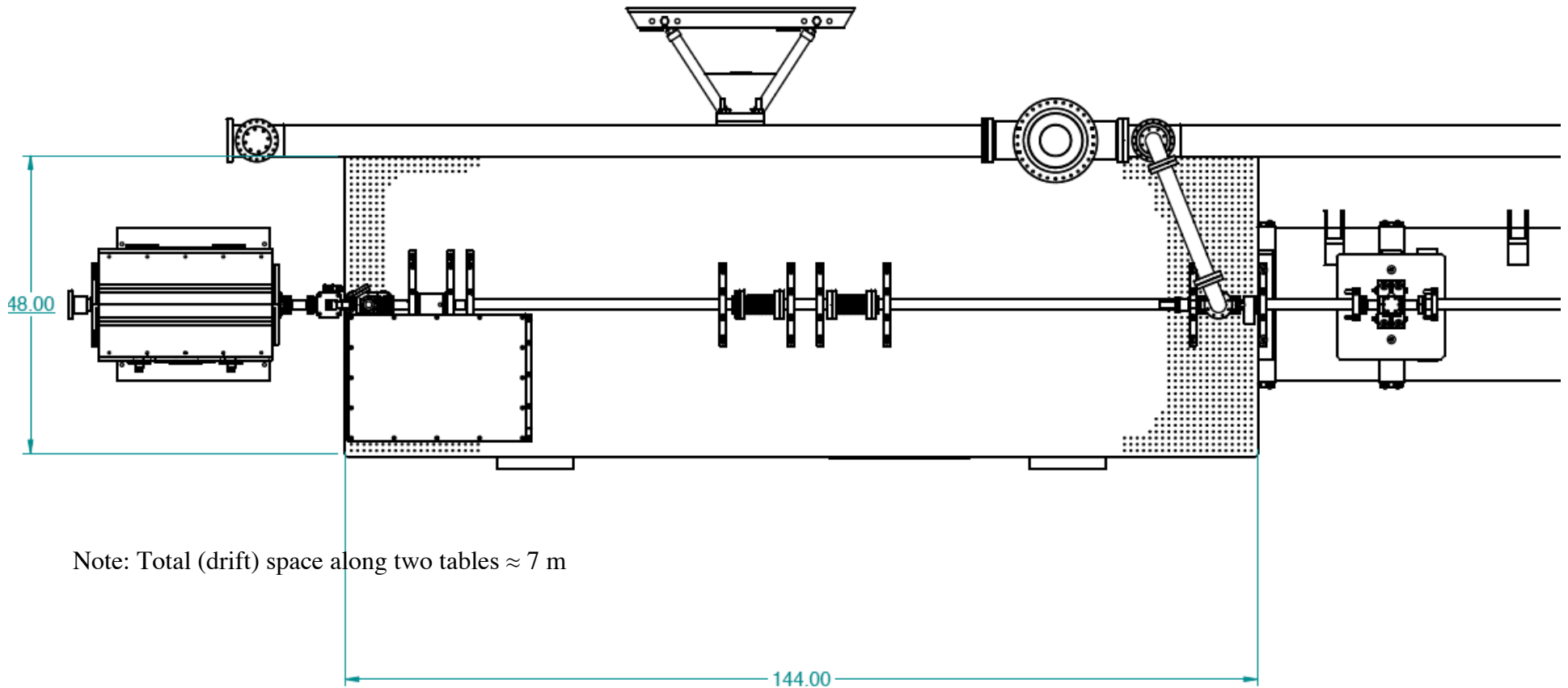
U. W
CLIC

IP Table Side View

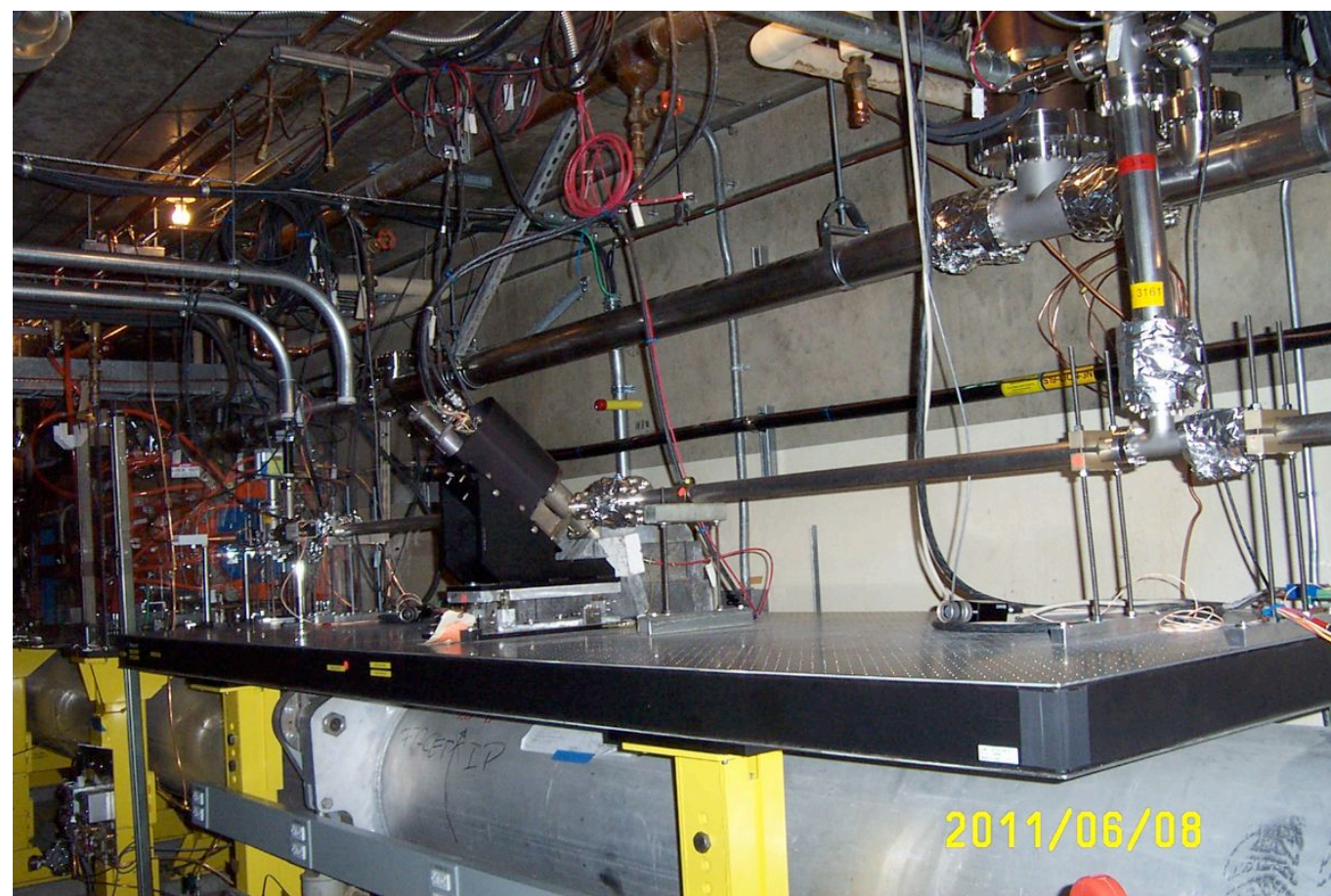


Note: Distance beam axis to table surface will be 9 inch (12 inch at present)

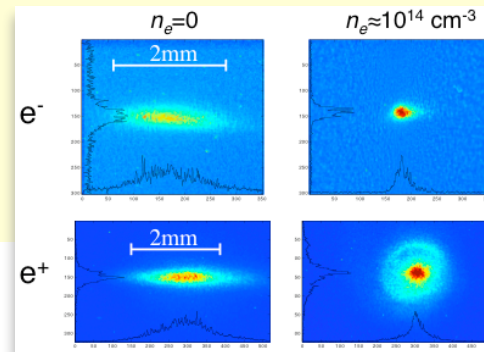
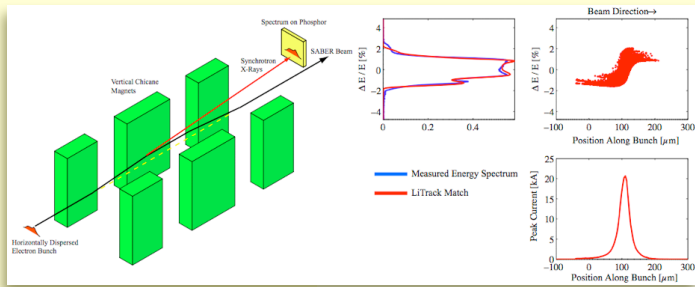
IP Table, Top View



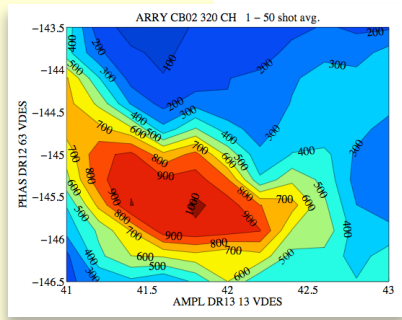
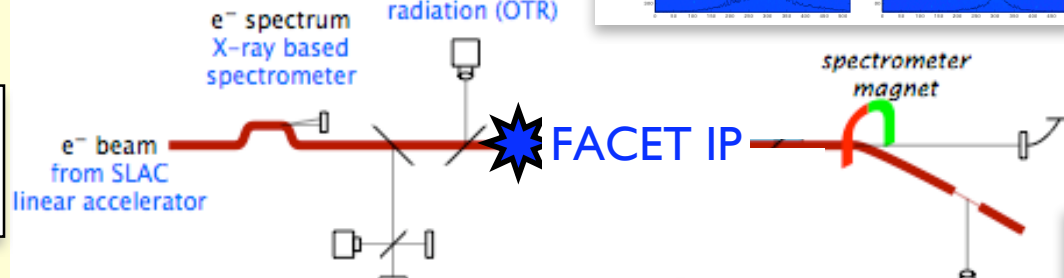
IP Table (12' by 4', >40" clear space above)



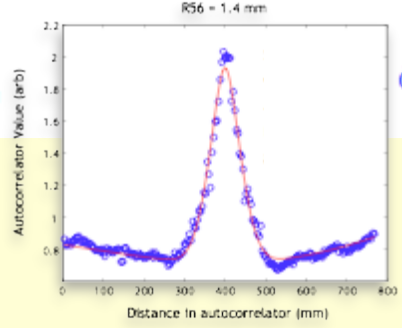
Some of the Beam Diagnostics



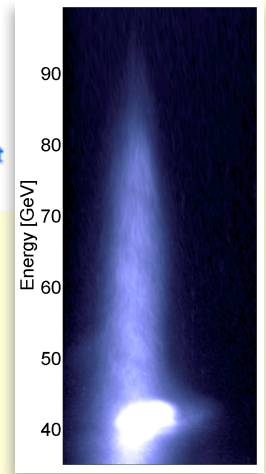
SLAC linac:
BPM's, Toroids,
Feedbacks,
GADCs, triggers



e^- bunch length
autocorrelation of
coherent transition
radiation (CTR)



e^- spectrum
Čerenkov light
in air gap



- First beam 16-June 2011
 - Beam-line commissioning
- Experiment installation \approx 7-July for \approx 1 week
- “User-assisted” commissioning mid July 2011
 - 2 Months, until early Sept. 2011
- Install S10 e^+ chicane by end of CY 2011
- First user run \approx Feb. 2011, 2 months
- At present 9 reviewed and approved experiments
- Next user meeting late August 2011.

Summary

- FACET will be a unique facility to advance the high-gradient acceleration research with plasmas and dielectrics
- Beyond this, FACET will allow a number of advanced experiments in solid-state physics and the study of particle interaction with matter.
- An open, proposal-driven process of experiment approval will allow equitable access to the facility to fore-front experiments