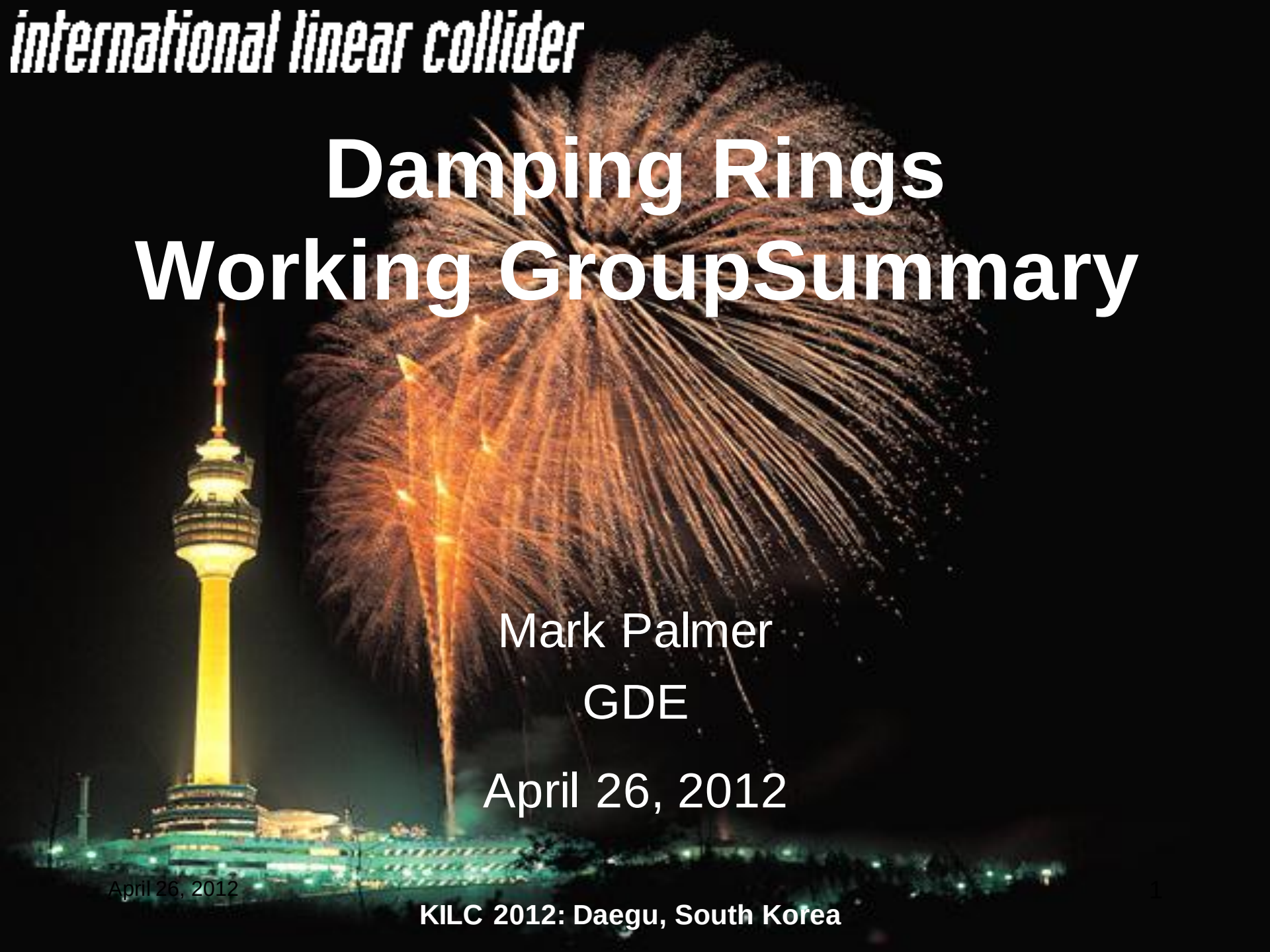


international linear collider

Damping Rings Working GroupSummary

Mark Palmer

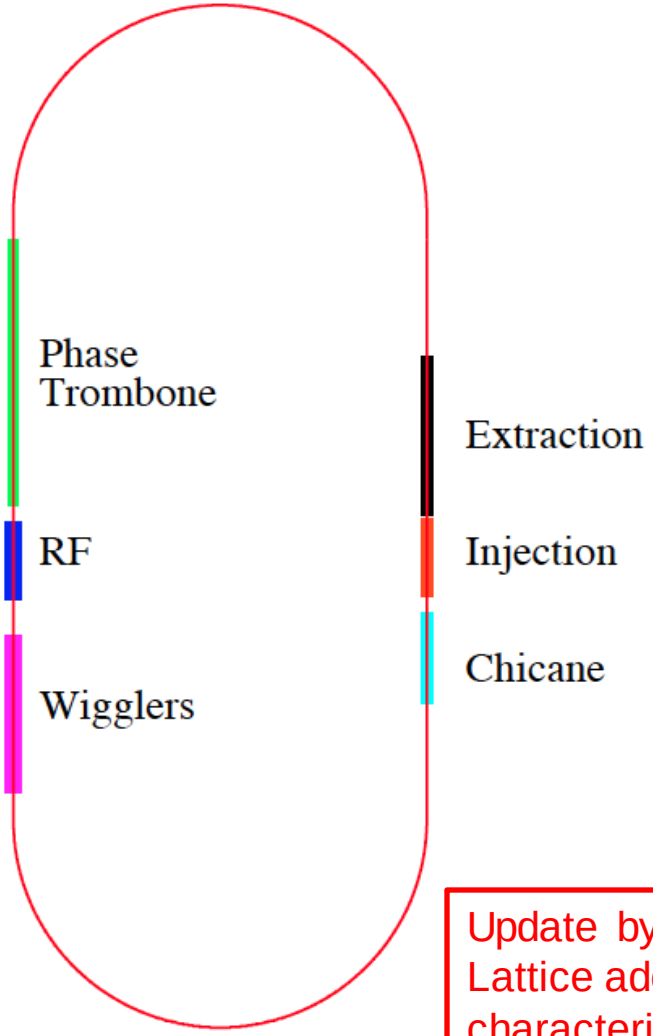
GDE

April 26, 2012

DR Sessions Overview

- Tuesday
  - **Lattice Characterization**
  - **Layout**
  - **Magnets & PS**
  - **Cost Discussion**
- Wednesday
  - **Vacuum System Design & Costing**
  - **Electron Cloud Updates**
- Thursday AM
  - **TDR Session**

DTC Lattice and Layout



Circumference - 3238 m

5.6 μ-rad < $\gamma\varepsilon_x$ < 6.4μ-rad

54 Wigglers

- length 2.1 m
- B_{peak} 2.2 T
- Poles 14
- Period 30cm
- 24ms > τ_x > 12ms

Phase trombone ➔ ± 0.5 λ_β

Chicane ➔ ± 3mm pathlength

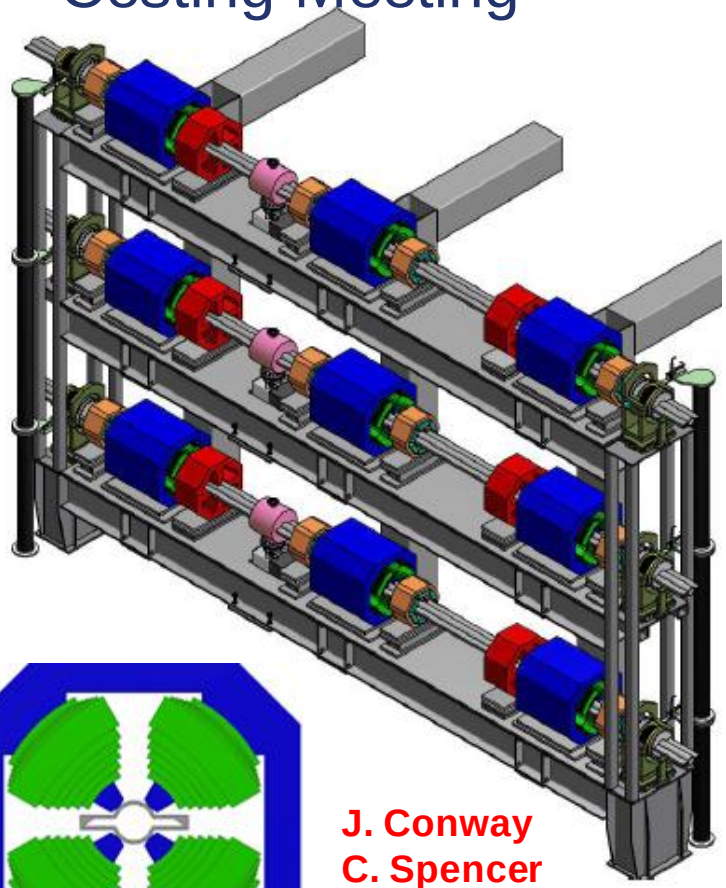
≤ 12 - 650MHz RF cavities

=> σ_l = 6mm

Update by D. Rubin –
Lattice adopted June 2011. Now completing final characterizations of the 3 different operating scenarios

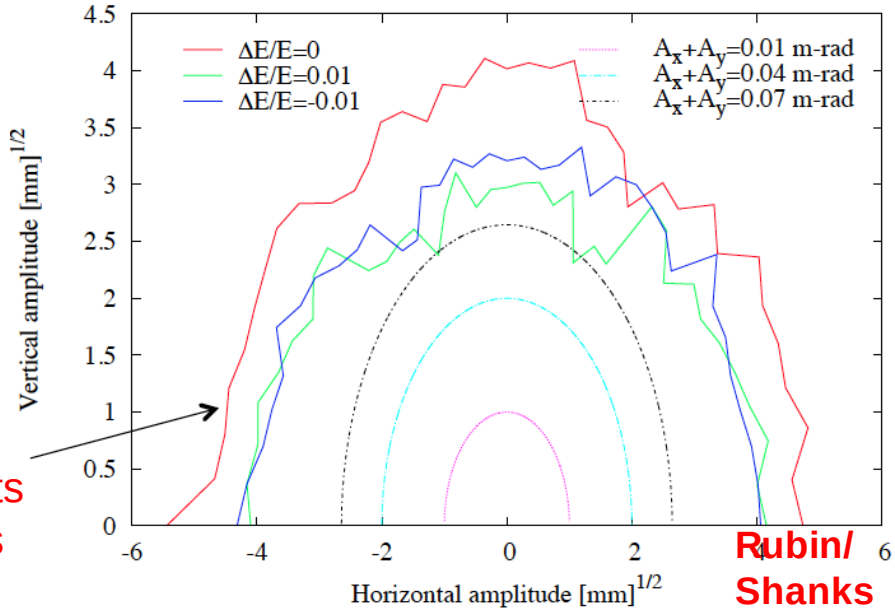
Tuesday

- DTC04 Lattice Evaluations
- Magnet Design & Layout Review
- Costing Meeting



J. Conway
C. Spencer

DA with misalignments & field errors



Rubin/ Shanks

Parameter	RMS
BPM – Differential resolution	2 μm
BPM – Absolute resolution	100 μm
BPM – Tilt	10 mrad
BPM button – Gain variation	1%
Quads + Sexts – Offset (H+V)	50 μm
Quads – Tilt	100 μrad
Dipole – Roll	100 μrad
Wiggler – Offset (V only)	200 μm
Wiggler - Roll	200 μrad

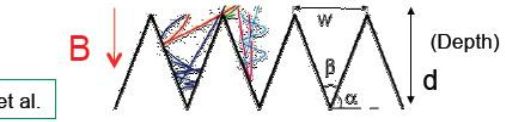
Ring Tolerances Evaluation for ε_y=2 pm using current LET Algos

Wednesday

Pivi Talk

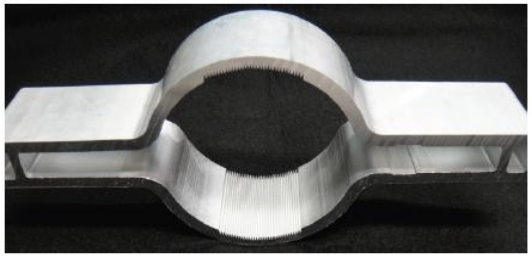
- EC Mitigations & Status
- Vacuum System Design/Costing
  - **SuperKEKB VCs in production with similar designs to ILC DR**

SuperKEKB Dipole Chamber Extrusion



et al.

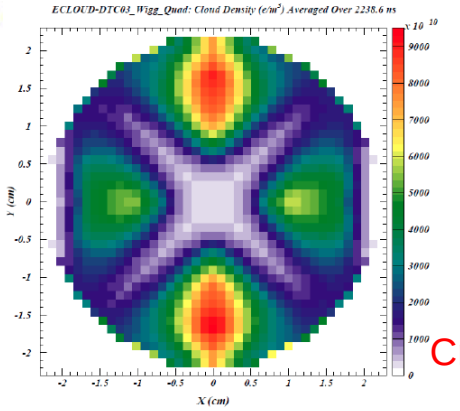
Valley : R0.1~0.12
Top : R0.15
Angle : 18~18.3°

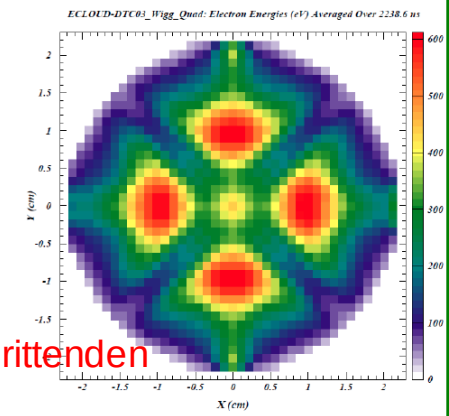


Y. Suetsugu

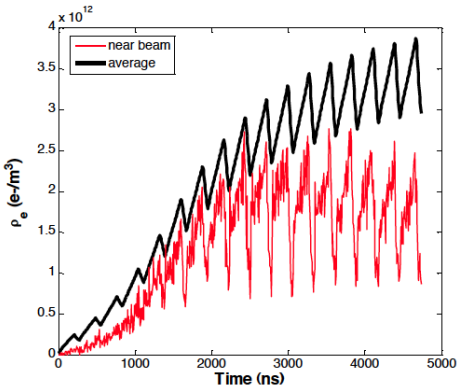
EC Build-up in Quads in Wiggler Straight

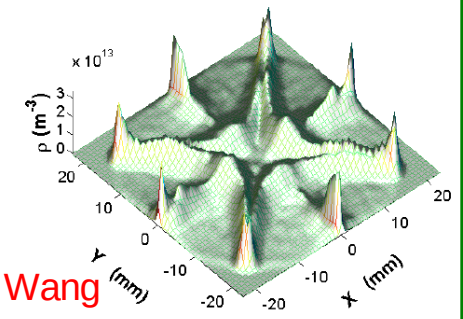
Electron cloud density (e/m^3) | Electron energies (eV)





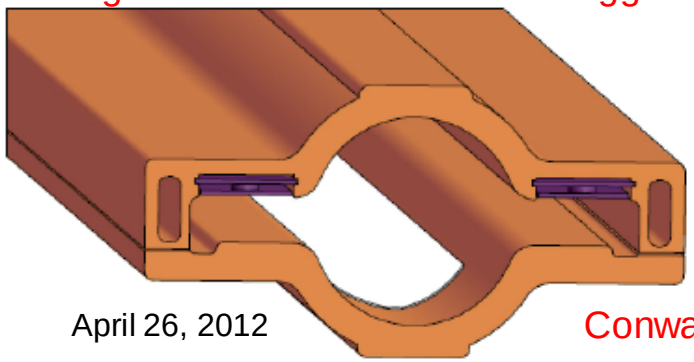
Crittenden





Wang

DR Wiggler chamber concept with thermal spray clearing electrode – 1 VC for each wiggler pair.



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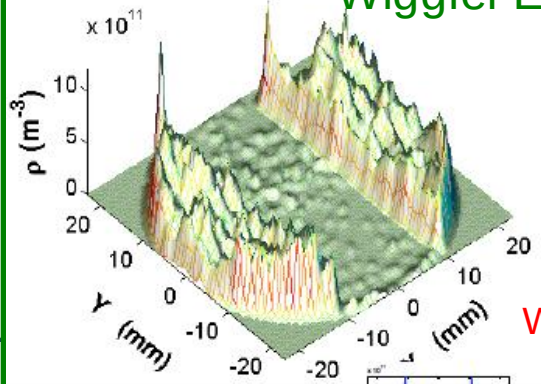
Conway/Li

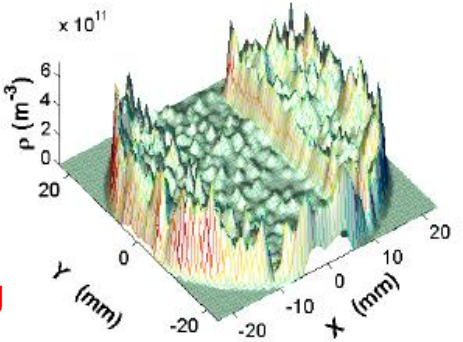
EC Suppression by Wiggler Electrode

+400V

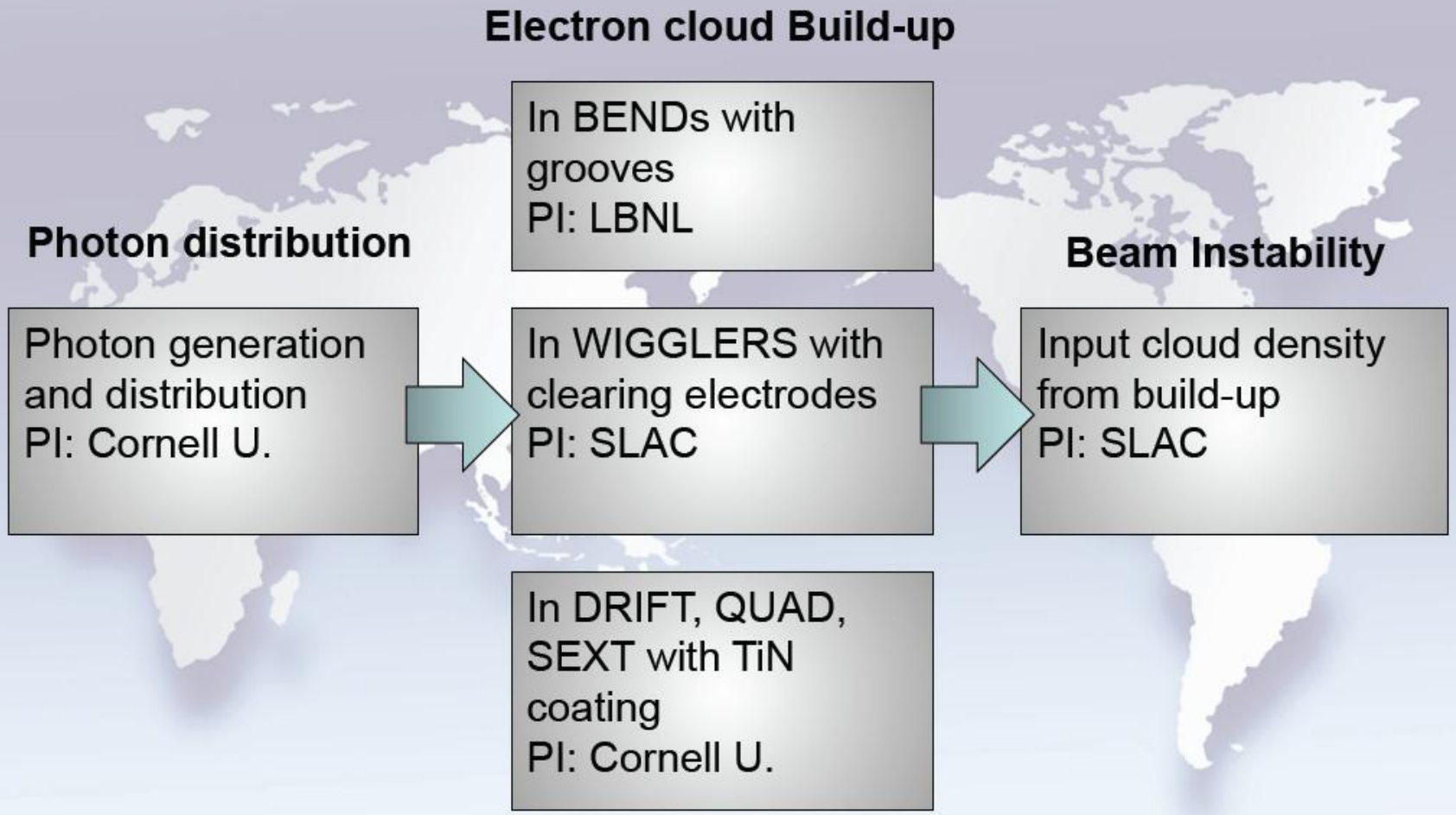
+100V



Wang



Electron cloud assessment for TDR: plan



M. Pivi

Conclusion

- Progress since Frascati BTR (July 2011)
  - **Lattice characterization in good shape**
  - **New designs in hand and closing out costing exercise**
    - RF System (10Hz modifications)
    - Vacuum System (particularly EC mitigation plan)
    - Magnets and Power Supply System
      - Changes for DTC lattice
      - Updated wiggler design for 10Hz operation
      - Distributed Power Supply System (greatly reduced cost)
  - **Full re-evaluation of EC build-up in ring and dynamics underway (expect baseline simulations to finish soon)**
    - Photon control critical ⇨ utilizes new tools from EC R&D program
    - Better understanding of sources of EC in ring
  - **Now moving on to completing our TDR contributions**