



# Damping Ring EDR Plans

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# Introduction

- ILC DR R&D planning is moving to a more top-down approach
  - work package choices being tailored to meet EDR requirements
    - a change from earlier proposal-driven approach
      - we wish to drive the proposals, not vice versa
  - coordination
    - S3 Task Force oversees global DR R&D Program
      - and will monitor its progress
- One difficulty is lack of clear understanding of what the EDR is supposed to represent
  - how much engineering vs. completing R&D tasks?
    - what R&D demonstrations are needed to proceed with EDR?



# R&D Priorities

- **Demonstration of viable baseline configuration**
  - **solution(s) to electron cloud instability**
    - wigglers, arcs, straights
      - **change to single PDR makes this a very high priority**
  - **solution to fast ion instability**
  - **observation of 2 pm vertical emittance**
    - at ATF or elsewhere
  - **provision of finalized lattice**
    - adequate dynamic aperture with realistic errors
    - suitable correction schemes to preserve low emittance
    - appropriate adjustability
      - **coupling correction, tunes, momentum compaction**
    - resistance to instabilities
- **Benchmarked simulation codes are “deliverables”**



# Engineering Priorities (1)

- **Demonstration of acceptable technical solutions**
  - **fast kicker system**
    - rise and fall times; amplitude and timing jitter; reliability
  - **wiggler vacuum system design**
  - **wiggler magnet design**
  - **overall vacuum system design**
    - vacuum performance; low impedance; low SEY
      - bellows, valves, bpm stability, bakeout issues
  - **supports and alignment**
    - adequate stability and alignment adjustability
      - for both rings in one tunnel
  - **RF system**
    - cryostat, cavity, HOM damping



## Engineering Priorities (2)

- magnet power system
  - control of magnets individually; acceptable heat load to tunnel; reliability
- diagnostics with adequate performance to see instabilities
  - precision; stability; dynamic range



# Coordination Issues

- There is complementarity among regions in a number of DR activities

- Europe

- electron cloud instability
- fast kickers
- wiggler modeling and dynamic aperture studies
- low emittance tuning

- Asia

- fast ion instability
- electron cloud instability
- fast kickers
- lattice design
- impedance issues
- vacuum system

U.S. working on  
all of these as  
well



# Who's Planning What

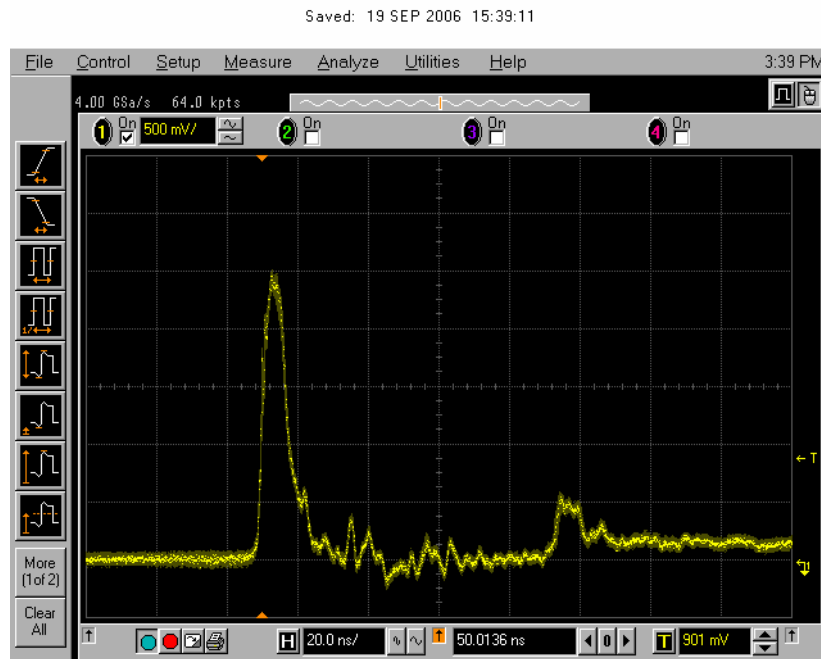
- Global activity summary (still incomplete; India missing)

	ANL	CI	Cornell	DESY	FNAL	IHEP	KEK	LBLNL	LNF	SLAC	KNU, PAL
kickers			•		•		•	•	•	•	
e-cloud			•	•	•		•	•	•	•	X
impedance	•	•					X	•		•	
lattice design	•				•	•		•		•	X
low- $\epsilon_y$	•	•					•	•		•	
ions				•			•			•	X X
vacuum		•				•	X	•			
acceptance	•		•			X		•		•	
RF system			•								
RF controls								•		•	
align/support			•					•			
mech.integration								•			
instrumentation	•		•			X	•	•			
feedback system								•	•	•	
wiggler			•	•					•		
main magnets						•		•			

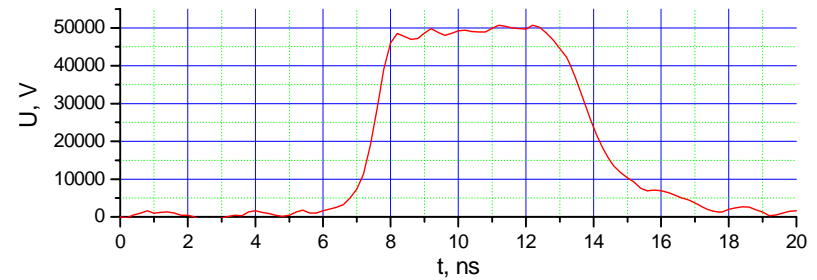
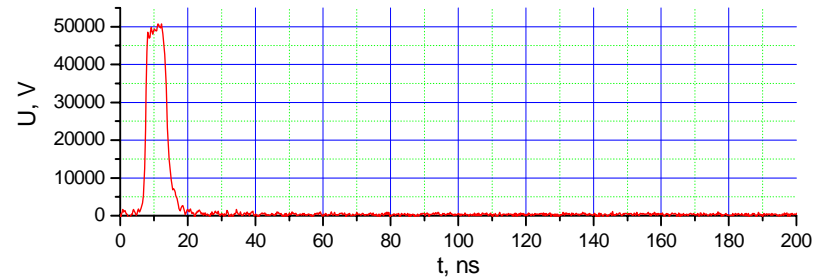


# Who is Doing What - Europe

- Progress at LNF on kicker development based on FIDs



Initial version



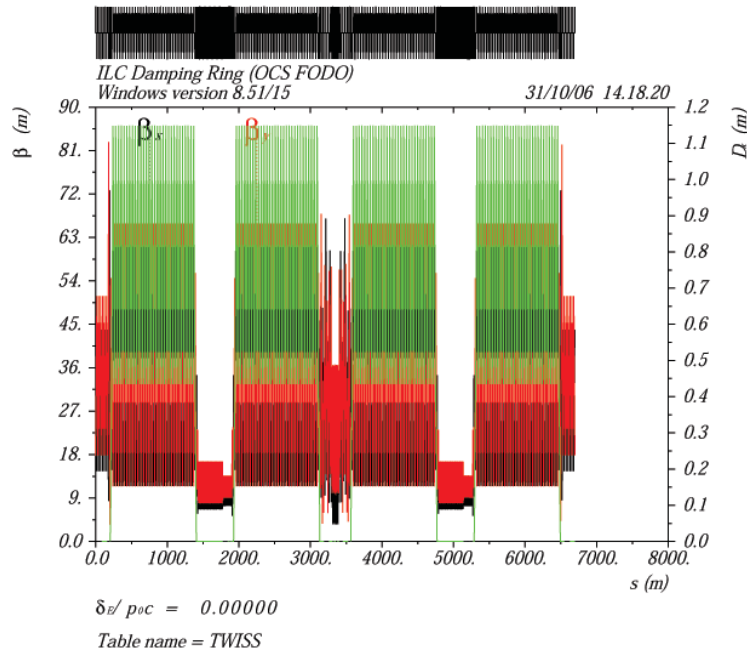
Latest version; better pulse shape and flat-top





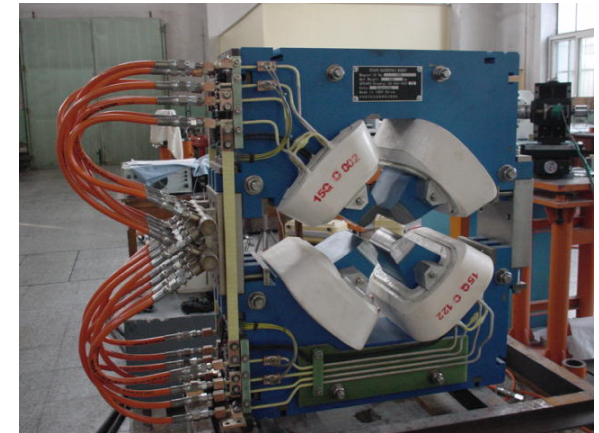
# Who is Doing What - Asia

- Learned much from our hosts about IHEP capabilities
  - help with engineering aspects would be *very* valuable



Alternative lattice design; 2  
wiggler-RF straights

SPEAR3 quadrupole



BEPC-2 vacuum  
chamber



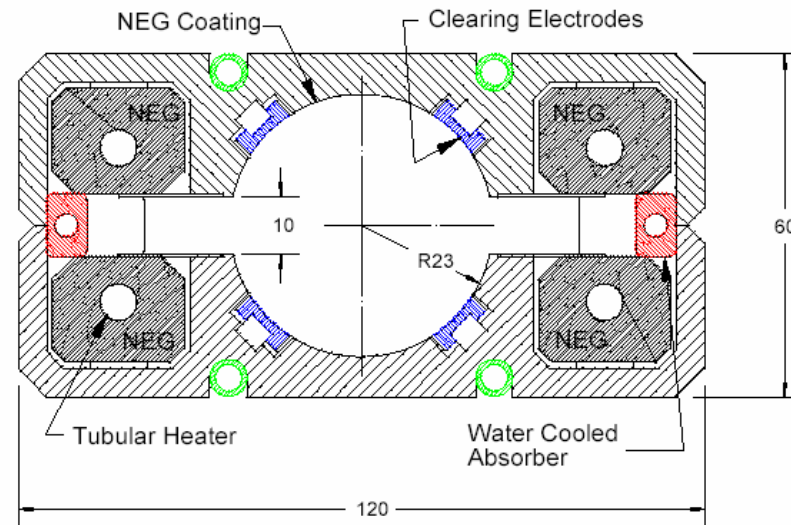


# Who is Doing What - Americas

- Efforts on ECI mitigation and wiggler vacuum chamber design under way



Grooved beam pipes for PEP-II tests (SLAC)



Wiggler chamber design concept (LBNL)



# Damping Ring Workshop

- Next DR workshop scheduled for Frascati in March 2007



## ILCDR07 - Damping Rings R&D Meeting

INFN-LNF, Frascati 5-7 March 2007

### GENERAL INFO

### PROGRAMME

### REGISTRATION

### ACCOMMODATION

### TRAVEL INFO

### CONTACT INFO

## GENERAL INFO

The "ILCDR07 - Damping Rings R&D Meeting" will be held at the Frascati National Laboratories on 5-7 March 2007.

The proposed list of topics to be covered are:

#### 1. ION EFFECTS

\* Conveners: Marco Venturini and Guoxing Xia

#### 2. LATTICE DESIGN

\* Conveners: Susanna Guiducci and Mark Palmer

#### 3. LOW-EMITTANCE TUNING

\* Conveners: Mike Zisman, Kiyoshi Kubo and Yunhai Cai



## Milestones (1)

- Finalized lattice by end of 2008
  - basis for much other work
- Characterization of ion effects and their control by end of 2008
- Demonstration of 2 pm emittance at ATF by end of 2008
- Demonstrated fast kicker solution by mid-2009
- Basic vacuum system design to permit detailed impedance evaluations by mid-2009



## Milestones (2)

- Sufficient engineering to demonstrate or validate required technical approaches by mid-2009
  - fast kickers, vacuum system, RF system, magnet power supplies, supports and alignment, wigglers, diagnostics, ...



# EDR Work Package Issues

- There is uncertainty within DR group about the concept of “bidding” for WPs
  - issues
    - regions do not have long-term control over budgets
      - lack of budget control makes bidding uncertain, if not impractical for most institutions
    - no mechanism for handling “contingent events”
    - many individual—and overlapping—work packages
      - U.S. DR program already dealing with some 80 WPs (though not 80 different topics)
      - generally better to have a WP associated with a particular institution, not a consortium
        - ♦ management is easier
        - ♦ problems with “double overhead” are avoided



## Summary

- Making progress at DR planning
  - coordinating via S3 to avoid redundancies and ensure that effort shared among regions
- Need to get EDR milestones defined and in place
  - issues: how much engineering needed for EDR; what technologies must be demonstrated
- Getting engineering help from Asia (KEK; IHEP) looks like possibility worth pursuing
- Proposed “bid process” remains a concern for DR groups