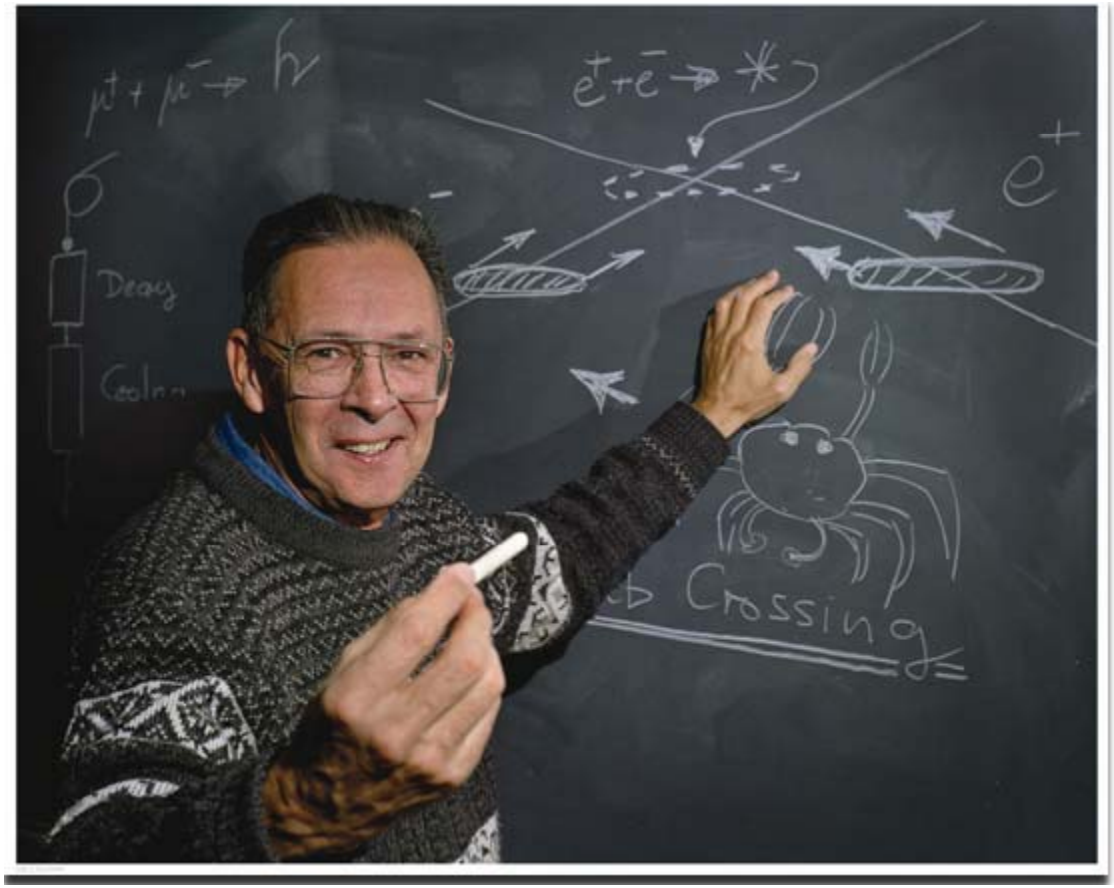
Welcome LHC-CC08

Bob Palmer:
Two-in-one magnet
Crab crossing



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Introduction

- A word about BNL/C-AD SRF program
- Construction of a prototype LHC-CC working with Advanced Energy Systems
- Crab cavities -
  - A reality in KEK-B
  - broad applicability
  - A subject of intense interest (you are the proof!)
- Potential for synergism and collaboration

Goals of the Workshop

- Learn from the KEK experience
- Establish a roadmap for crab cavities at the LHC:
  - Define the timeline for crab cavities at the LHC
    - Detail the various steps
    - Estimate time scales
  - Define work packages and potential distribution of tasks among collaborating laboratories
- This roadmap will be presented in the summary

Decide the following:

- Global or local crabbing?
- What optics for the adopted scheme?
- What is the location of the cavities if global?
- What is required for a local scheme?
- Therefore, do we need an exotic cavity?
- At what frequency?

Decisions - continued

- Is there a workable small angle (local) straw-man layout?
- What are the approximate D1 (and other magnet) upgrade requirements? (Table)
- Where does the AES prototype get installed?
- What are the engineering challenges?
- Questions which cannot be answered identify R&D areas to work on.

How do we get started?

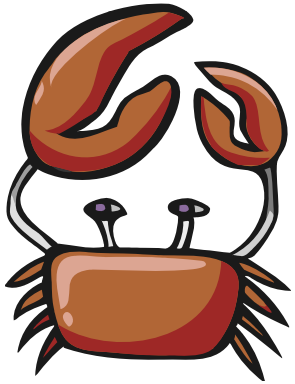
- In Nominal LHC we have available 5-10m in IP4, therefore only one cavity per beam to do global crab crossing for only one IP.
- We may start by building one cavity (per beam?) proof of principle, both for SRF & beam tests. Test at LHC circa 2010-2011.
- Are there other potential places for the test?
- What come next?

Charge to discussion leaders:

- Guide the discussions to cover the issues defined above.
- Please follow guidelines as described in Ram Calaga's email to the chairs (see backup slides)
- Summarize the findings and recommendations for the summary.

If you brave New York in February…

You must be really dedicated to



Welcome!

Backup slides

Charge to discussion leaders

1. Optics & Integration (Oide)
   a. Choice of Freq: 800 MHz (400 MHz)
   b. How much free space is available both for global or local
   c. Global or Local for Upgrade Phase I

Charge to discussion leaders

2. Crab Cavity Noise Effects (Seryi)

   a. Noise effects and simulation benchmarking status

   b. Operational reality

Charge to discussion leaders

3. Design, Fabrication & Processing (Padamsee)

   a. Max achievable gradient in deflecting mode

   b. Required length of the crab system (cavity cryostat etc..)

   c. Do we need more than 2-cells (pros-cons)

   d. How much polarization is needed (beam related, space related)

   e. Optimum geometry and cavity aperture

   f. Damping mechanisms (Effective + Robust)

Charge to discussion leaders

4. Crab Cavities Around the World (Ben-Zvi)

   a. Lessons to be learned from previous and ongoing projects

   b. What components can be directly adapted for LHC system

   c. Which components needs most R&D focus

Charge to discussion leaders

5. Impedance Issues (Rimmer)
   a. Cavity impedance and frequency choice
   b. Cavity Aperture
   c. HOM power and efficient extraction mechanisms
   d. Thresholds for single and multi bunch effects

Charge to discussion leaders

6. RF Control (McIntosh)
   a. Input power requirements & Qext
   b. Power handling capacity of the different couplers
   c. Max. allowable phase jitter, feedback requirements
   d. Type of power amplifier and related stability

Charge to discussion leaders

7. Discussion Packages (Zimmermann & Calaga)
   a. Main R&D steps and priorities
   b. Distribution of work packages among the constituents
   c. Rough time scales