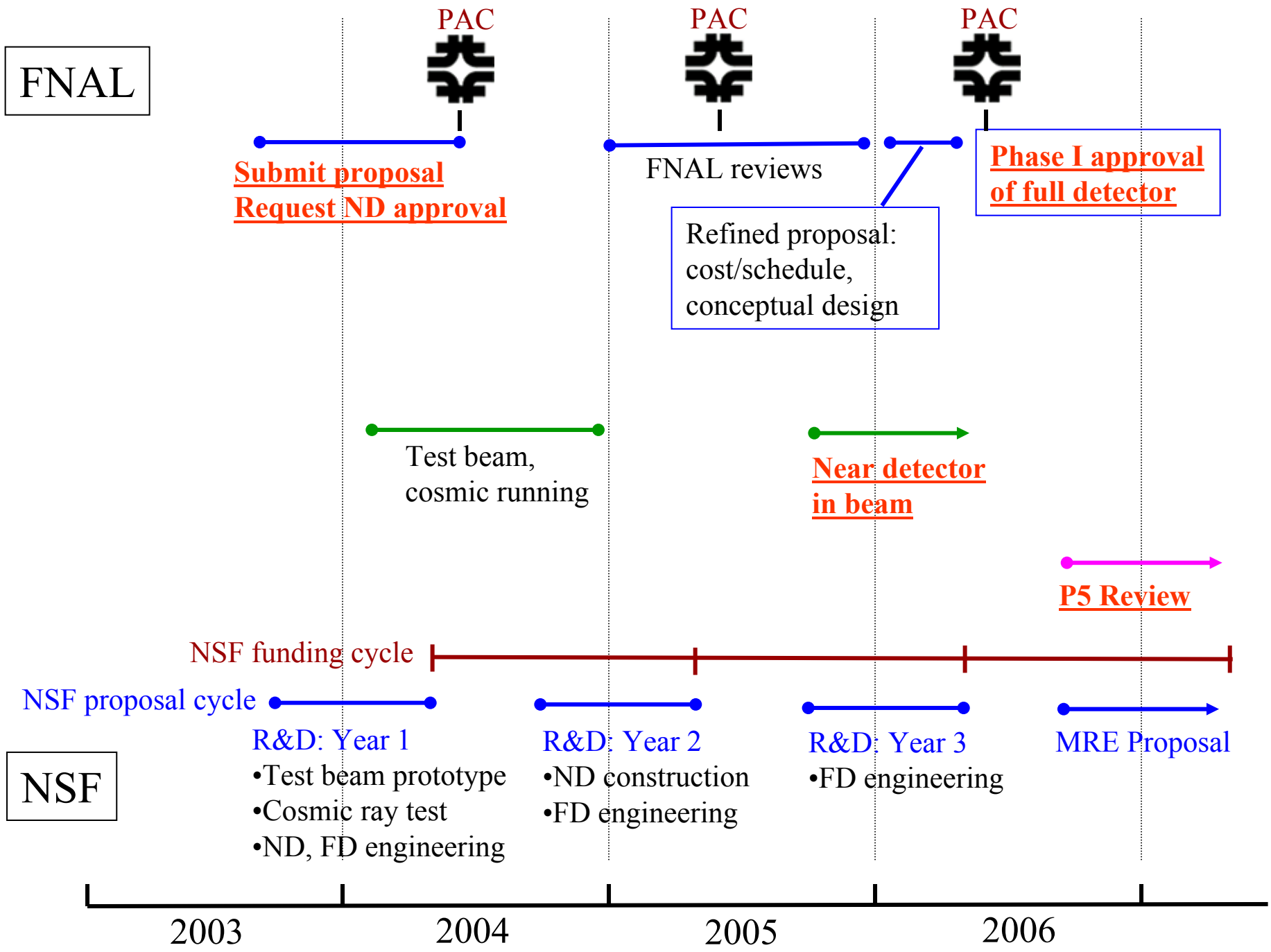
- Exciting time for neutrino physics!
- The possibility of observing CP violation in the neutrino sector presents a great experimental challenge and opportunity. It may well be within our reach in not-so-distant future
- Search of $\nu_\mu \rightarrow \nu_e$ oscillations is the next step.
- The FNAL Main Injector neutrino beam provides a unique resource for this measurement (and represents a significant investment) that should be exploited.


FNAL
PAC
PAC
PAC
Submit proposal
Request ND approval
FNAL reviews
Phase I approval
of full detector
Refined proposal:
cost/schedule,
conceptual design
Test beam,
cosmic running
Near detector
in beam
P5 Review
NSF funding cycle
NSF proposal cycle
NSF
R&D: Year 1
•Test beam prototype
•Cosmic ray test
•ND, FD engineering
R&D: Year 2
•ND construction
•FD engineering
R&D: Year 3
•FD engineering
MRE Proposal
2003
2004
2005
2006

External Constraints/Factors

- Run II performance
  - Fermilab
  - Beams Division
  - People
  - Resources (money, protons)
  - Accelerators (priorities, cycle time, wear and tear)
- 'Other experiments'
  - Run II upgrades
  - CKM
  - BTeV
- Other 'other experiments'
  - JHF
  - Possible new reactor experiment

- These factors are beyond our control.
- We have to watch them and adjust our plans accordignly
- Our best strategy is to have a focused plan assuming the 'best scenario'
- The 'system' (and our own colleagues) will take care of putting on the breaks

Next milestone: proposal by October 2003

- Physics case
  - Specific location(s) (LTV and Kenora?): specific beam spectra, rates, backgrounds
  - Physics potential of the experiment (in different phases). Multi-dimensional space, different scenarios. Use few specific examples? (near CHOOZ, factor 5, factor 10?)
  - $\mathrm{Sin}^2 2\theta_{23}$ measurement and MINOS
  - Articulate long term program: phase 1 detector, proton source, phase 2 detector
  - Relationship with other initiatives (determination of mass hierarchy – J-PARC + NUMI, $\sin^2 2\theta_{13}$ – reactors + NuMI, CP violation J-PARC + NuMI, narrow band beams vs wide band BNL)

- Physics potential (Figure of Merit, FOM) and the detector parameters:
  - Containment/fiducial volume
  - Longitudinal sampling (per view)
  - Transverse granularity
  - Voids and dead material
  - Use of pulse height information
  - Single particle efficiency
  - Stereo angle between views
  - Noise, cross talk

- Beam induced backgrounds:
  - νe in the beam
    - How to determine
      - MINOS near detector numu/numubar
      - Dedicated near detector
    - Systematic errors
  - NC/CC(ν_μ) backgrounds
    - What is the systematic error today?
    - What measurements doe we need to achieve
    - How to do them: near detector(s), how many, what kind?
    - Relation to other proposed initiatives

- Cosmic rays/surface detector
  - Statement of the problem (muons/gammas/neutron induced)
  - Impact on our physics results
  - Possible auxiliary measurement
  - Mitigation techniques:
    - Overburden
    - Active shield

Proposal writing: August/September

- It will be a challenge in any event
- It can be made much easier (realistic?) if issues are documented. Off-axis notes
- Coordinators:
  - S. Parke
  - L. Camilleri
  - S. Wojcicki
  - K. Ruddick
- Need input/work/workers