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Activities in Europe and Canada

“Future neutrino physics” workshop in Canada

- **Physics goal:** $\theta_{13} \rightarrow CP$
- **Experimental approach:** *Superbeam* $\rightarrow \nu$ -factory
- **Opportunities in the next decade:**
 - ν -factory R&D
 - Superbeams
 - CERN SPL \rightarrow Frejus?
 - CERN β neutrino beam?
 - BNL/Fermilab \rightarrow Homestake etc.?
 - NuMI off-axis beam**
 - beam available in 2005, detector?
 - JHF-Kamioka:** “most advanced program”
 - expect to start in 2007

Future opportunities in Europe

- ν -factory R&D
- Superconducting Proton Lineac (SPL)
 - H^- lineac + Accumulator + bunch compressor
 - 2.2GeV proton at 10^{16} POT/sec \Rightarrow 4MW
- SPL \rightarrow superbeam to Frejus
 - Horn focus $\rightarrow E_\nu \sim 0.25$ GeV
 - UNO (400kton water Čerenkov) at Frejus tunnel
- SPL $\rightarrow \beta$ neutrino beam
 - ${}^6He \rightarrow {}^6Li e^- \nu_e$: pure ν_e beam.
 - SPL \rightarrow ISOLDE \rightarrow PS and SPS \rightarrow storage ring
 - Similar ν intensity expected as ν -factory
 - 100GeV/nucleon ($\gamma=100$) $\Rightarrow \langle E_\nu \rangle = 350$ MeV.

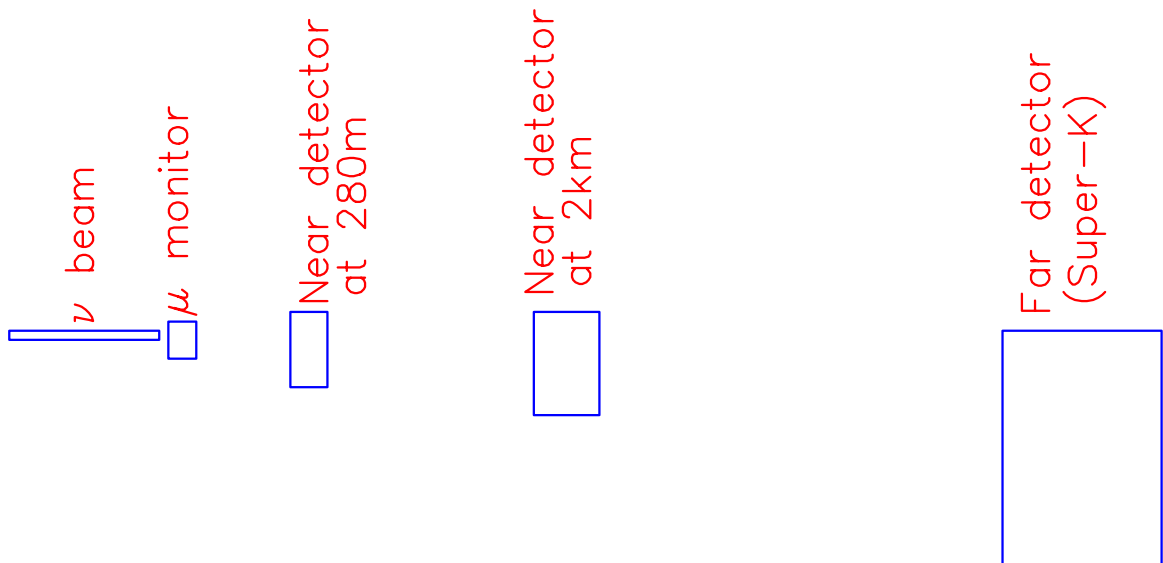
R&D budget at CERN is down by a factor of 5 to 0.3MCHF.
<http://nufact.cern.ch/NUFACT-RD/NUFACT-RD.html>

Strong interests in Canada

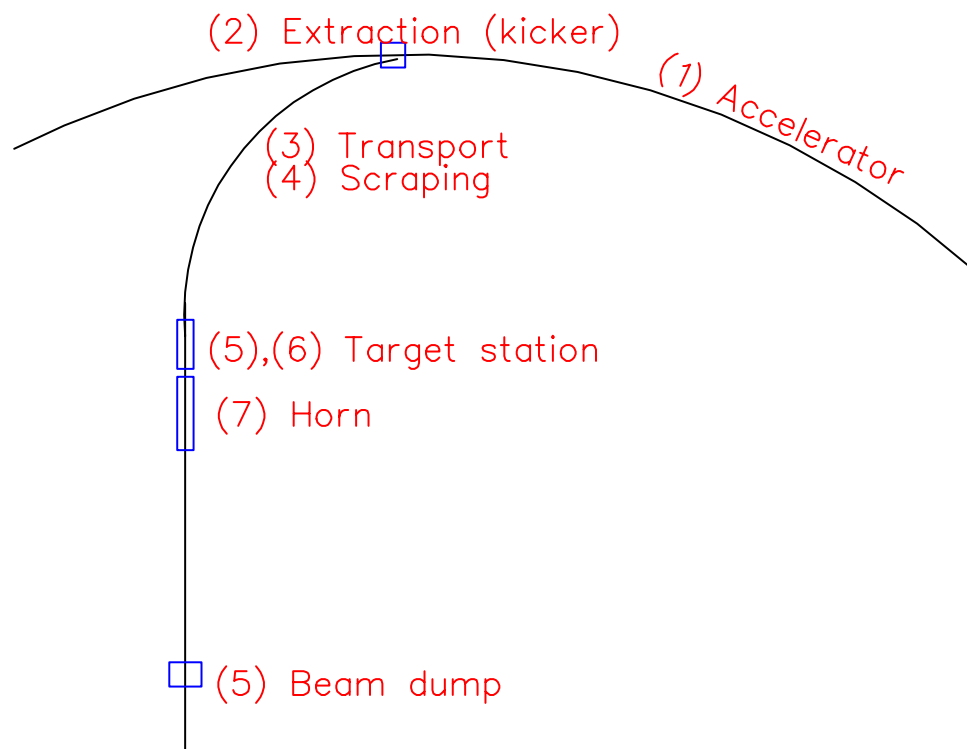
- Canadian involvement in LBL ν projects
 - BNL-E889 proposal
 - Neutrino experiment at KAON
- Strong interest in the subatomic physics community
 - SNO : solar ν oscillation \Rightarrow ν oscillation
 - LEP,LHC,E614 : Electroweak \Rightarrow GUT
 - B/K decays : CKM \Rightarrow MNS
 - Others : Exciting physics \Rightarrow ν physics
- Expertise in both detector and facility construction
- “High priority” rating in the LRPC report
- Excellent candidate for the next TRIUMF 5-year plan
- “Workshop on future opportunities in neutrino physics”
 \Rightarrow Superbeam working group formed (18 members)

Experties in Canada (experiment)

- Conceptual design
off-axis beam, e/π^0 separation, CP \Leftarrow
- Development of the off-axis beam idea \Leftarrow
- GEANT simulation of the off-axis beam \Leftarrow
- Near detector technologies
Fine grained calorimeter (KOPIO R&D)
- Far detector technologies
Water purification technologies, etc. (SNO)



Experties in Canada (facility)



- Canadian experties on neutrino facility

1. High intensity proton accelerator (KAON) ⇐
2. Primary proton extraction and kicker magnet (KAON,LHC)
3. Beam cleaning for the superconducting line (LHC)
4. Design of the primary proton beam optics ⇐
Initial design of the beam transport and
GEANT study of the scraper (J. Doornbos)
5. Handling of elements under high radiation area (ISAC)
6. Target for high intensity beam (TRIUMF,E787)
7. Horn and off-axis neutrino beam (E889) ⇐

- Good candidate for the TRIUMF 5-year plan