

Asian Test Beam Facilities

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Japan

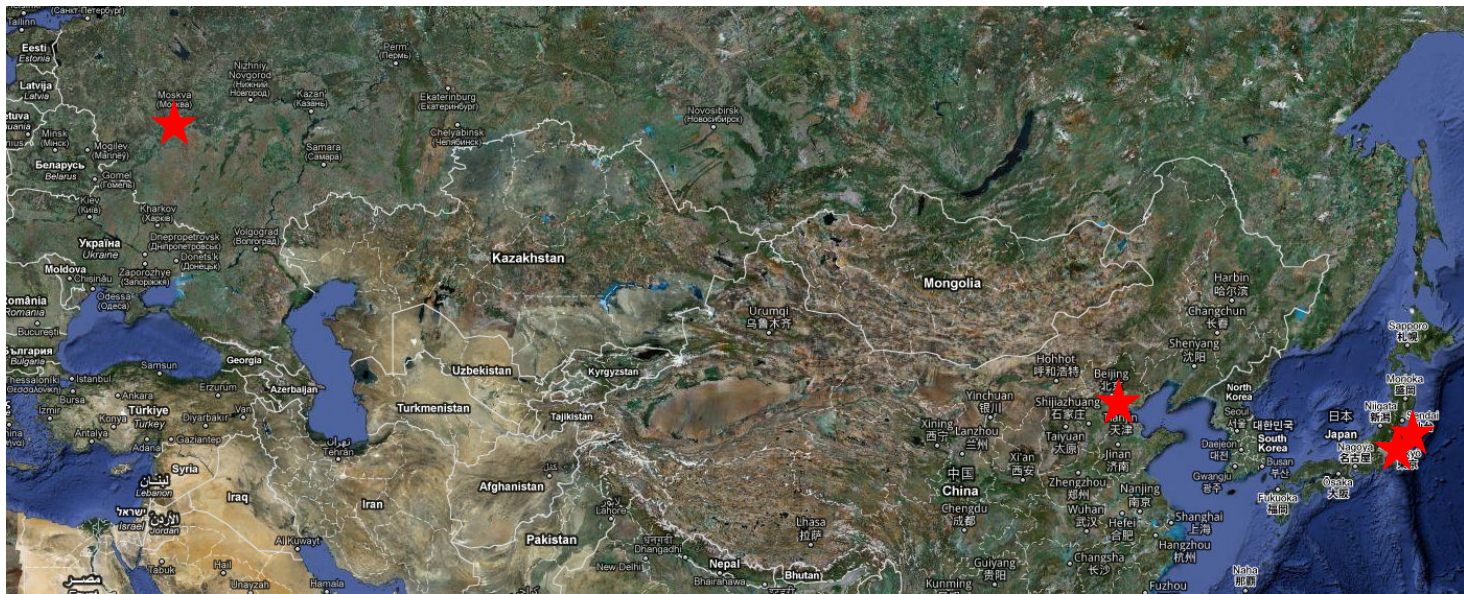
- J-Parc test beam facility
- Tohoku Univ. LNS
- KEK Fuji Test Beamline (0.4-3.4 GeV e^-)
(shutdown at least until 2012, future plan not clear)
- KEK ATF/ATF2 (0.4-1.4 GeV e^-)
(dedicated for beam study, difficult for testbeam use)

China

- IHEP Beijing TBF

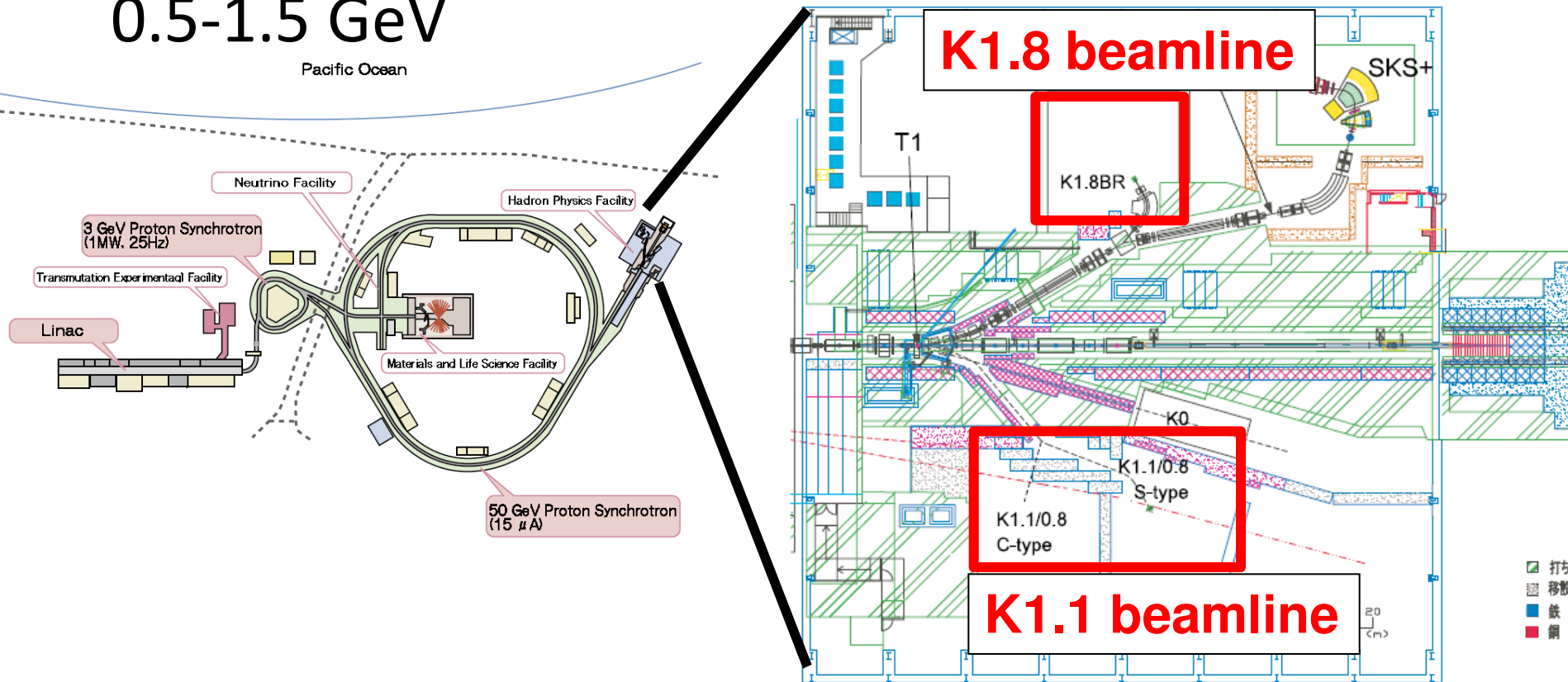
Russia

- IHEP Protovino



KEK J-PARC test beam facility

- Available beams at K1.1: pions, protons of 0.5-1.5 GeV



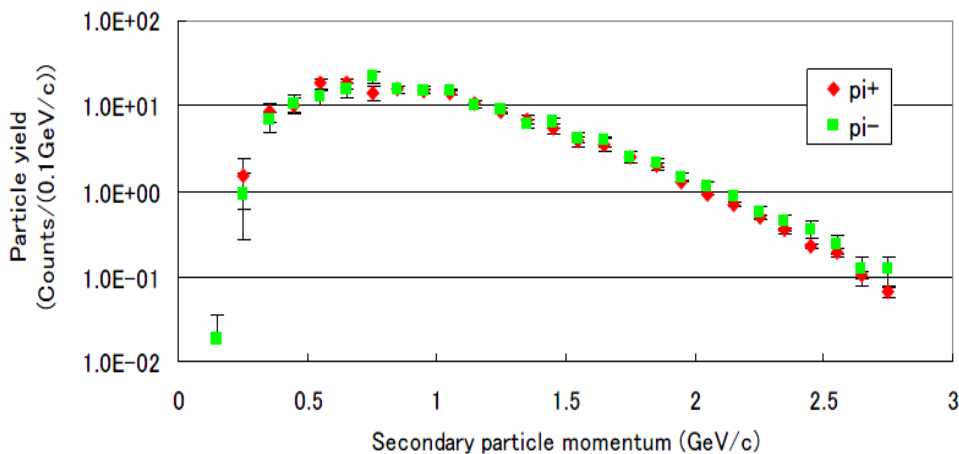
Two areas being prepared :

- K1.8 ... expected to be the main testbeam facility.
- K1.1 ... Tentative facility until K1.8 is ready

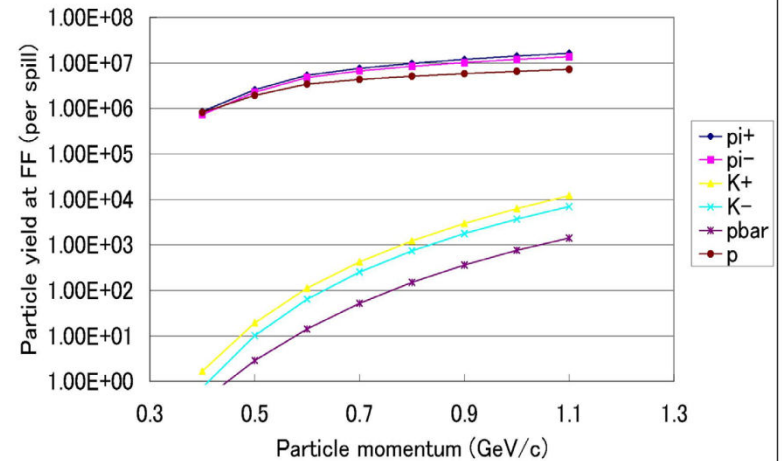
J-PARC TB facility status & plans

- **K 1.8** ... Designed as the main testbeam facility, but will not work with low intensity beam from the main ring.
(Need $I_{MR}=100\text{kW}$, but will be just $I_{MR}=5\text{kW}$ in initial stage.)
- **K 1.1** ... located in future fixed target experiment.
tentative option for start-up phase, it works even at $I_{MR}=1\text{kW}$.
Expected to be available for users during Oct-Dec 2010.

Expected yield at K 1.8 ($I_{MR}=1\text{kW}$)



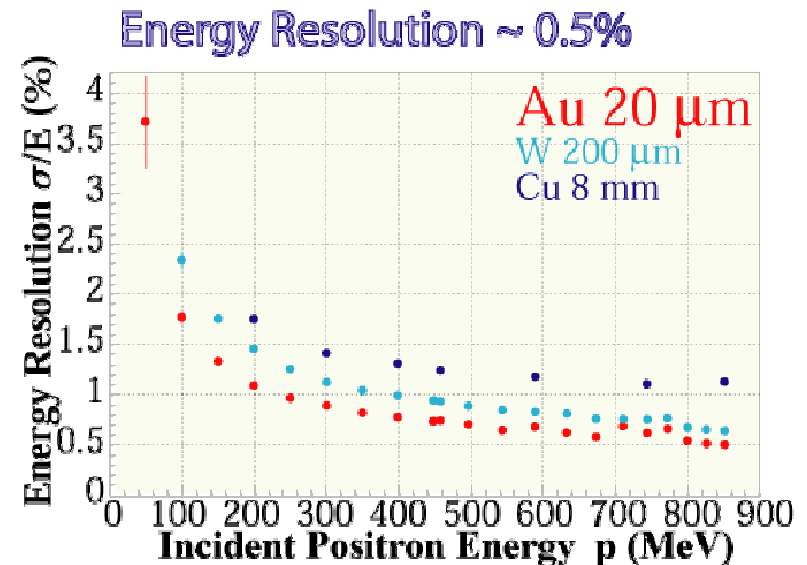
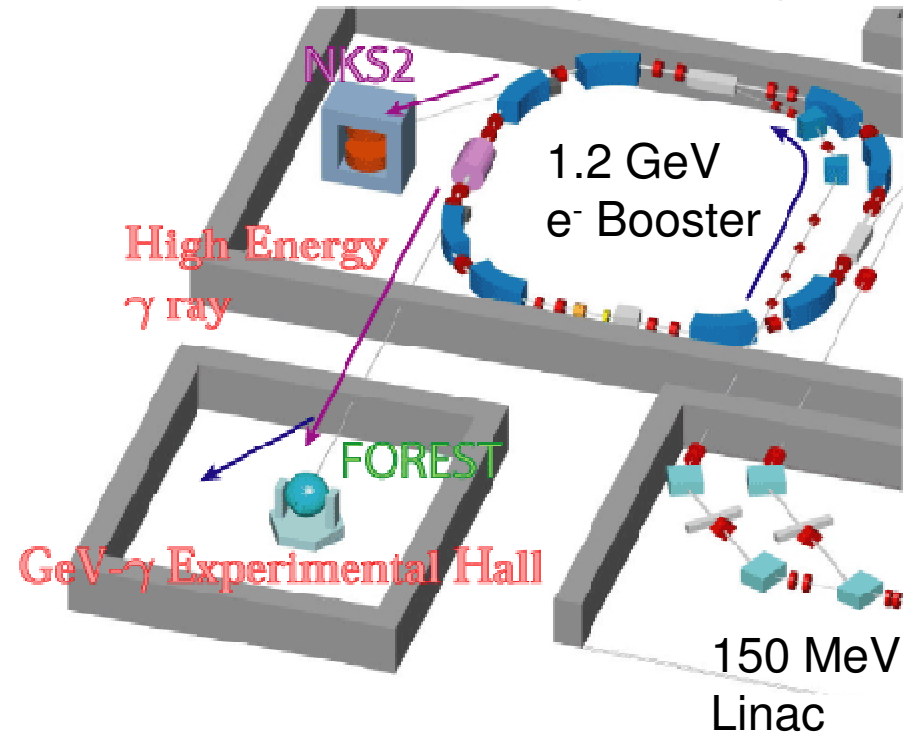
Secondary particle intensity at K1.1BR (30GeV-8E+11 PPP)



Facilities for users are also under preparation.

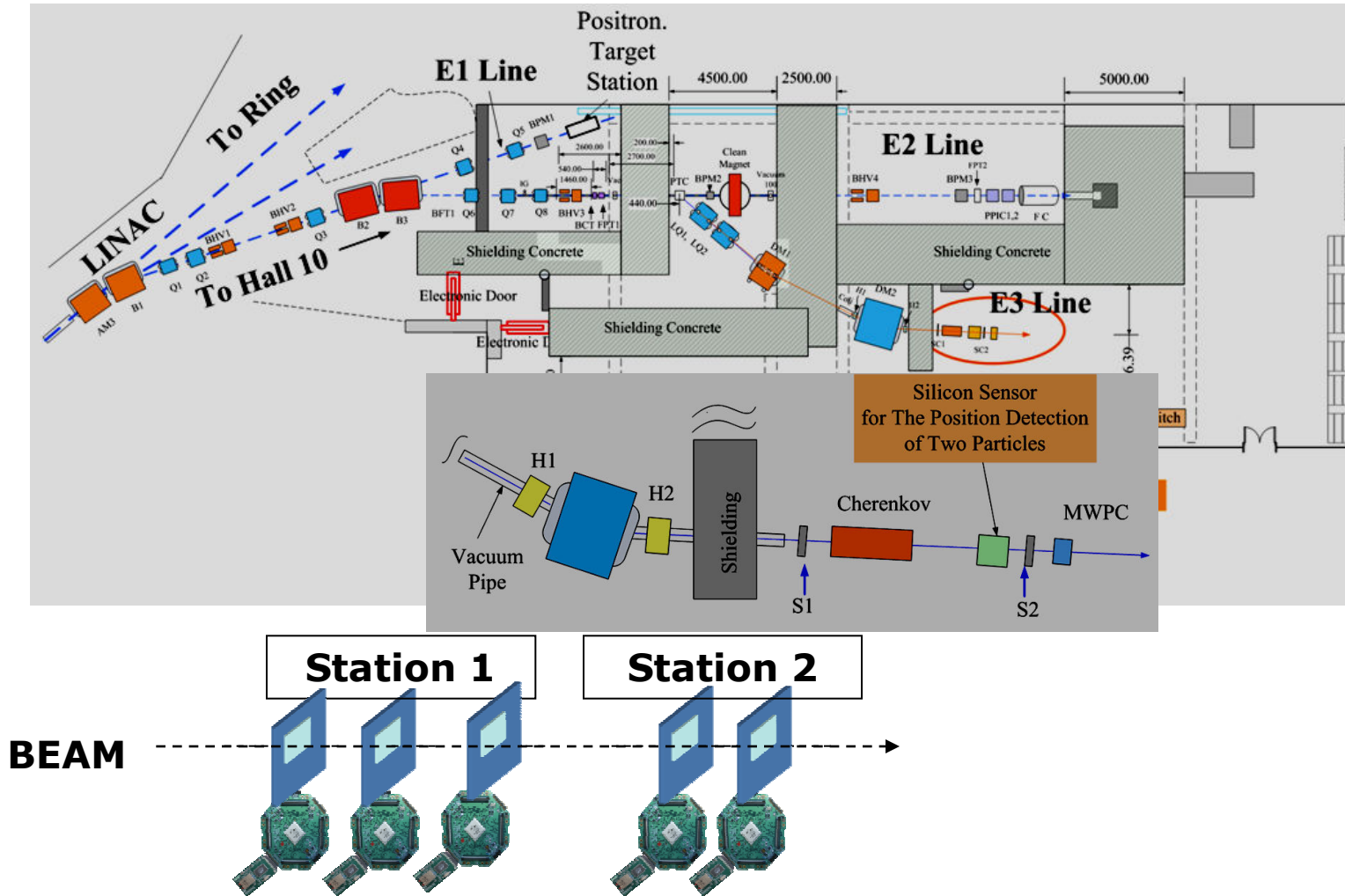
Tohoku Univ. Lab. Of Nucl. Sci. (LNS)

- Electron- Bremsstrahlung photon facility mainly for hadron physics.
- Partially positrons up to 950 MeV available for testbeam.
- Positron rate 2~3 kHz
7-sec on / 7-sec off spill.
- To use the beamline, need to find co-working group in Japan for crelical issues (radiation regulation etc...)
- Can apply the beamtime anytime.



IHEP Beijing Test Beam Facility

- Upgrade of the IHEP beamline is being done at the end of this year.
- e^+ , π^+ , p beam line equipped with Cerenkov detector, silicon tracker and MWPCs.



IHEP Beijing Test Beam Facility

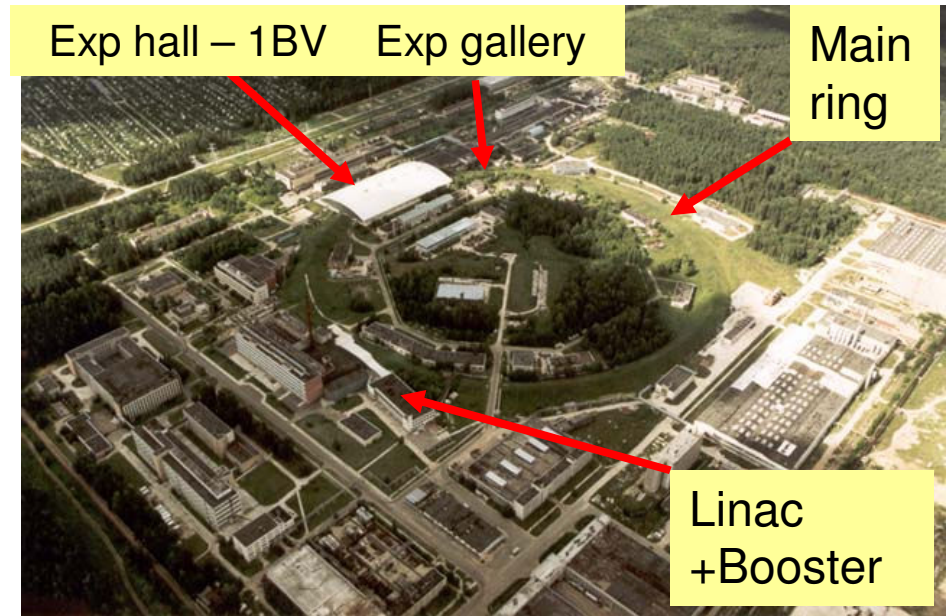
Parameter	Primary Electron Beam		Secondary Beam	
	Before	Upgrade	Before	Upgrade
N_e / Bunch	10^{10}	$10^2 - 10^{10}$	1	1 - 2
Energy (GeV/c)	1.1 - 1.5	1.1 - 1.89	0.4 - 1.2	0.3 - 1.2
Energy Spread	< 1%	< 1%	1%	0.5%
Kinds of Particle	$e^{+/-}$	$e^{+/-}$	$e^{+/-}, \pi^{+/-}, P$	$e^{+/-}, \pi^{+/-}, P$
Bunch Width(ns)	1.2	1.2, 0.02		
Bunch Rate (Hz)	25-50	25-50	1.5-2(Single); 7-8 (Mixed Multi- particles)	1 -2(Single); ~ 1 (two particles)

2008.07-2010. 12 Shut down for the upgrade and has a short-term running of E2 line;

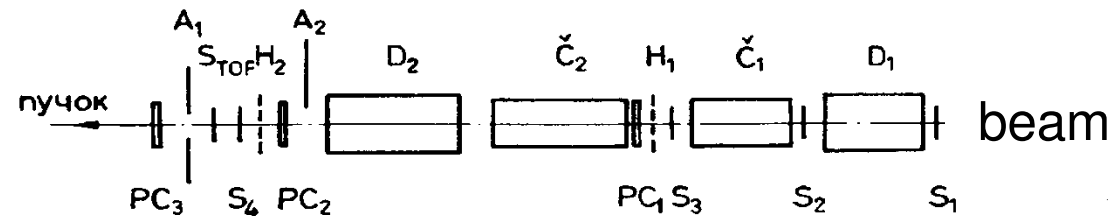
2011.01 Commission

Protovino in IHEP Russia

- 70 GeV accelerator complex for protons
- Works two times per year,
 - March-April
 - Nov-Dec
- For each run 1 month for physics
- cycle time - **10 s**
- spill time - **1.8 s**
- intensity $\sim 1 \cdot 10^{13}$ p/cycle
- Several beam lines available



Beam monitoring system on N2B line



- S₁-S₄, A₁, A₂ - scintillation counters
- PC₁, PC₂ - proportional chambers
- H₁, H₂ - scintillation hodoscopes
- C₁, C₂ - threshold cherenkov counters
- D₁, D₂ - differential cherenkov counters
- S_{TOF} - time-of-flight scintillation counter

Protovino in IHEP Russia

Beam line
N 2B

Electron beam

Hadron beam

Energy, GeV	Intensity in spill on 10^{12} pot	Content		
		e, %	μ , %	h, %
1	$4 \cdot 10^2$	82	10	5
2	$1 \cdot 10^3$	77	15	8
5	$2 \cdot 10^3$	50	32	18
10	$5 \cdot 10^3$	34	35	30
27	$4 \cdot 10^4$	77	9	13
45	$2 \cdot 10^4$	91	4	5

Energy, GeV	Intensity in spill on 10^{12} pot
33	$1 \cdot 10^6$
40	$3 \cdot 10^6$
55	$2 \cdot 10^5$

Beam line
N 22

- Proton beam: up to 70 GeV/c, $I = 10^6 - 10^{10}$ pps
- Secondary hadron beam
 - negative: 7 - 60 GeV/c, $I < 6 \cdot 10^8$ pps
 - positive: 7 - 60 GeV/c, $I < 10^{10}$ pps
- electron/positron beam: 7 - 40 GeV/c, $I < 5 \cdot 10^5$ pps

Summary

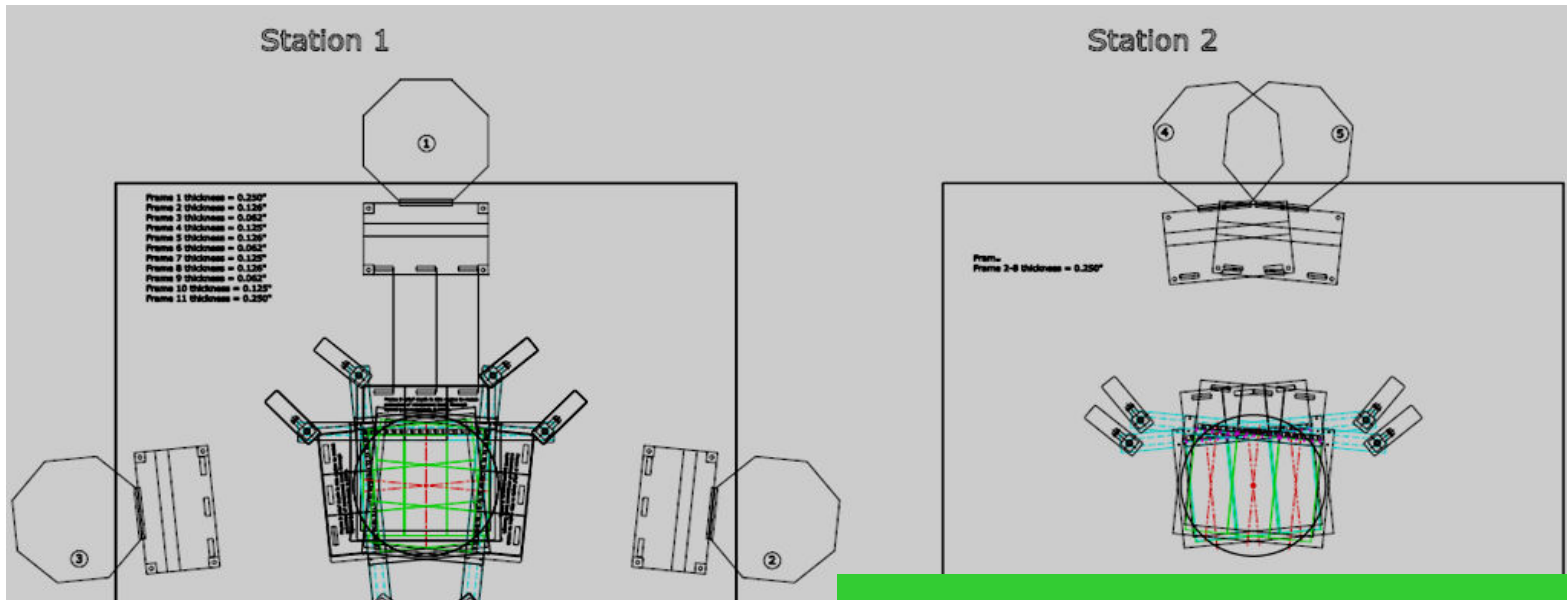
Working (or will be working) beamlines in Asia and Russia :

- **J-PARC** ... 0.5-1.1 GeV π , p beams with rate $\sim 10^7$ per spill.
K1.1 line will be available since \sim Oct 2010.
K1.8 will be set up in future, it will provide beams in wider energy range.
- **Tohoku LNS** ... 0.1-0.95 GeV e^+ with rate \sim kHz available
Small facility, may be difficult to support international team.
- **IHEP Beijing** ... e^\pm (1.1-1.9 GeV) and π^\pm/p (0.3-1.2 GeV) beams
Upgrade will be finished in this year.
- **Protovino Russia** ... $e^-(1-45$ GeV), $h^\pm(1-60$ GeV), $\mu^-(1-55$ GeV)
Available \sim 2 months / year (April, Nov-Dec)

Backups

Silicon Sensor Telescope for Beijing TBF

Provided by Xiao CAI (IHEP) & Marcel Demarteau (FNAL)



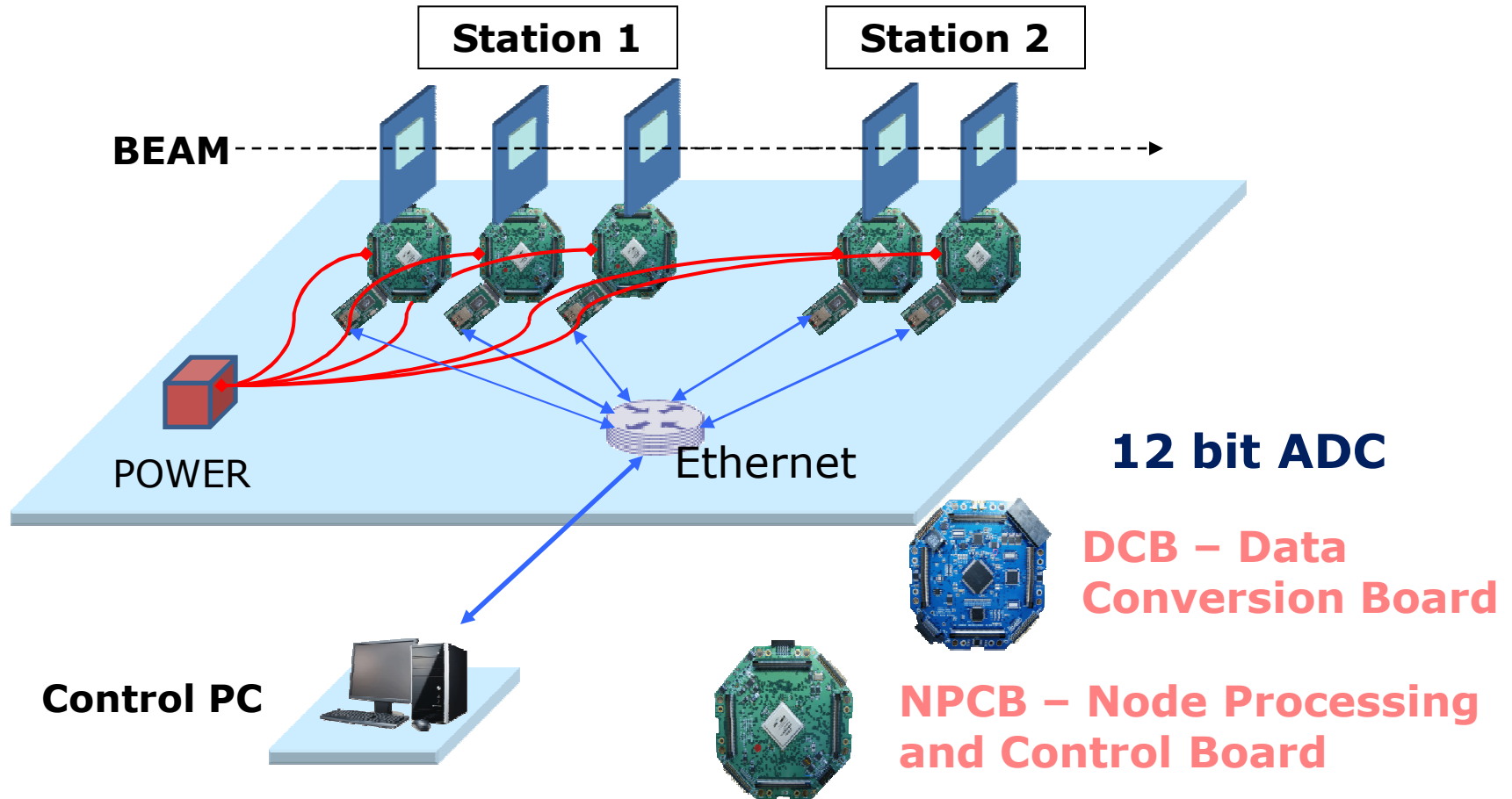
"3+2" Structure

- Station1: 3 planes
 - No ghost (fake point)
- Station2: 2 planes
 - Using a small angle between planes

Objective:

- Providing Tracking
- Distinguishing Double Particles Event

Readout (CAPTAN)



IHEP accelerator

70 GeV accelerator complex for protons =

Linac - URAL-30, 30MeV

+

Booster – 1.5 GeV

+

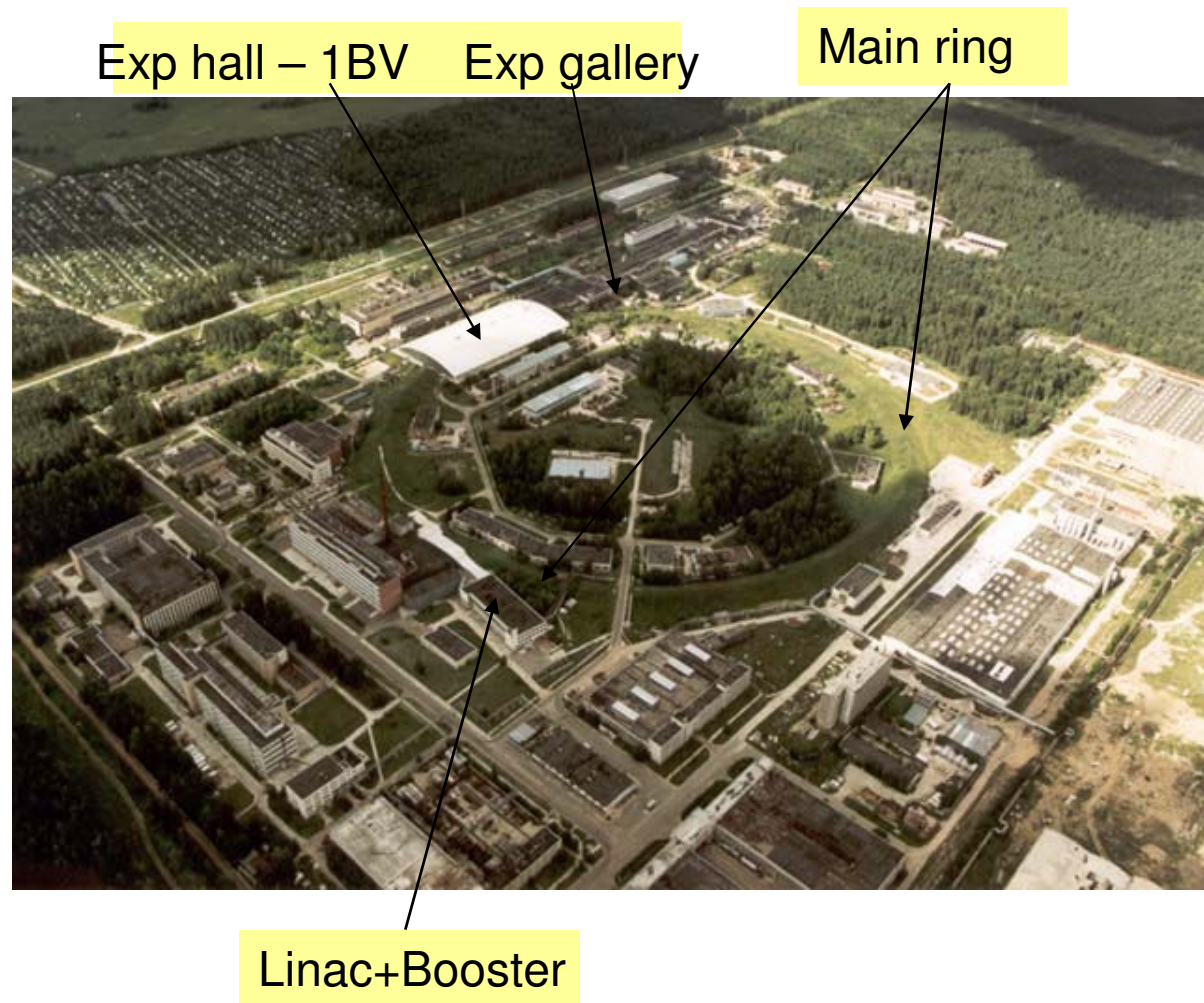
Main ring – 70 GeV proton synchrotron

Works two times per year

March-April

Nov-Dec

For each run 1 month for physics



IHEP accelerator parameters

- cycle time - **10 s**
- spill time - **1.8 s**
- intensity $\sim 1 \cdot 10^{13}$ p/cycle
- number of bunches - **30**
- RF structure: bunch length – **40 ns**,
bunch spacing – **160 ns**
- beams are from extracted protons and internal targets

Beams

In the 1BV exp hall are from internal targets with limited intensity ($<10^{**7}$ part/spill):

- negative hadrons up to 55 GeV
- positive hadrons up to 20 GeV
- photons, electrons up to 30 GeV
- 70 GeV protons from crystals

In the exp gallery are from extracted protons, have high intensity :

- protons
- intensive secondary hadrons
- neutrino