JÜLICH
FORSCHUNGSZENTRUM

Preassembly Session at CM XLII. at CNRS (Ks1-260)

10. September 2012 | Frank Goldenbaum

Preassembly Session at CM XLII.

Goal: discussing/informing **regularly** about the planned pre-assembly in Juelich.

i) mechanical preassembly in the test hall

ii) functional preassembly in the external hall (in-beam tests of detector protoypes or components)

…get a clear picture about the actual status and the approach to readiness for the pre-assembly

AGENDA: Monday 10 September 2012

15:00 - 15:05	introduction 05'	
	Speaker:	James Ritman (Forschungszentrum Juelich)
15:05 - 15:20	status test facitilies 15'	
	Speaker:	Frank Goldenbaum (Forschungszentrum Juelich)
15:20 - 15:40	mechanical preassembly: solenoid cryo plant 20'	
	Speaker:	Maxim Mikirtychyants
15:40 - 16:00	MVD preassembly at Julich? 20'	
	Speaker:	Daniela Calvo (INFN - Sezione di Torino)
16:00 - 16:20	EMC forward endcap assembly and system test at Juelich 20'	
	Speaker:	Fritz-Herbert Heinsius (Ruhr-Uni Bochum)
16:20 - 16:40	discussion 20'	
16:40 - 17:00	summary 20'	

time-line / planned scenario

Schedule:

- assemble **solenoid-magnet** (funds avail. in 2013?) and do complete field mapping until 2015 (in the COSY test-hall)
  - ✓ COSY test hall cleaned up – almost empty now
  - ✓ high floor load, detailed floor map existing, crane 50t, hook 15m
  - ✓ 3 MW elec. and > 1 MW cooling available → cooling sufficient if dipole and solenoid operate separately

- in parallel: **high rate realistic in-beam tests** of individual detector components in the COSY area in 2015 (and already now!)
- Mechanical integration of “full” PANDA in the COSY test-hall in 2016
- Transport to and setup in Darmstadt 2017

Considerations for the Magnet

- At HESR no central LHe (closest plant ~500 m)

- PANDA will need its own compression, liquefaction and storage.

  ⟶ Cryogenic plant is foreseen at FZJ which would be relocated to FAIR. Maxim Mikirtytchiants has been assigned to this task following Raccanelly's departure. Detailed information and time lines needed to proceed. It takes 1 to 1.5 years to order the components.

  ⟶ mechanical integration (coils, joke, cryostat, transfer lines,…)

- Field mapping ?

  ⟶ for solenoid: equipment needed (not existing in IKP), man-power?

  ⟶ (HESR-dipoles: will be mapped at CERN)

- Successive implementation/tests of the detectors

This session 15:20 - 15:40
mechanical pre-assembly: solenoid cryo plant
Speaker: Maxim Mikirtychyants

functional pre-assembly
detector/prototype/component tests…

COSY provides the possibility for experiments to perform detector component tests at beam conditions.

COSY Beam Parameters:

Energy range
0.045 – 2.8 GeV (p)
0.023 – 2.3 GeV (d)
(momentum 3.7 GeV/c)

Cooling (transverse & longitudinal)
2 methods:
electron, stochastic
$\Delta p/p \leq 5 \cdot 10^{-5}$

Polarization
p, d beams & targets

Beams
internal, extracted

Activities, Experiments, detectors
ANKE, TOF, WASA, EDM, PAX, …

COSY Beam Parameters… cont'd

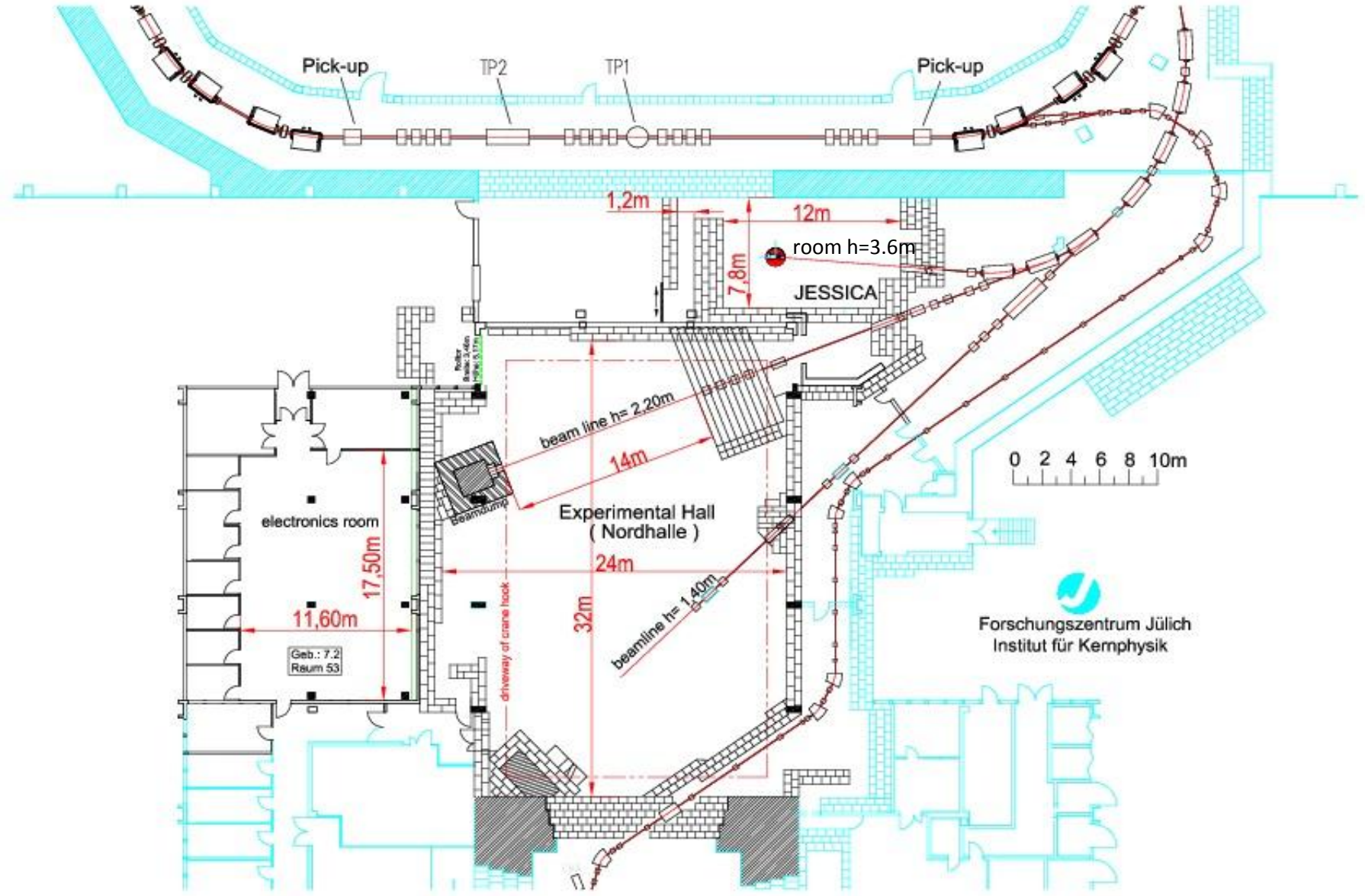
- **beam quality:**
  - without cooling: $\Delta p/p \sim 2 \cdot 10^{-4}$
  - electron cooling: $\Delta p/p \leq 5 \cdot 10^{-5}$ p_p<0.6 GeV/c
  - stochastic cooling: $\Delta p/p \leq 5 \cdot 10^{-5}$ p_p>1.5 GeV/c

    $\varepsilon = \pi$ mm mrad 1mmØ·0,18°
- **beam intensities (cooled):**
  - protons, unpolarized: $1 \cdot 10^{11}$
  - protons, polarized: $1 \cdot 10^{10}$
  - deuterons, unpolarized: $1 \cdot 10^{11}$
  - deuterons, polarized: $6 \cdot 10^{9}$ (by stacking)

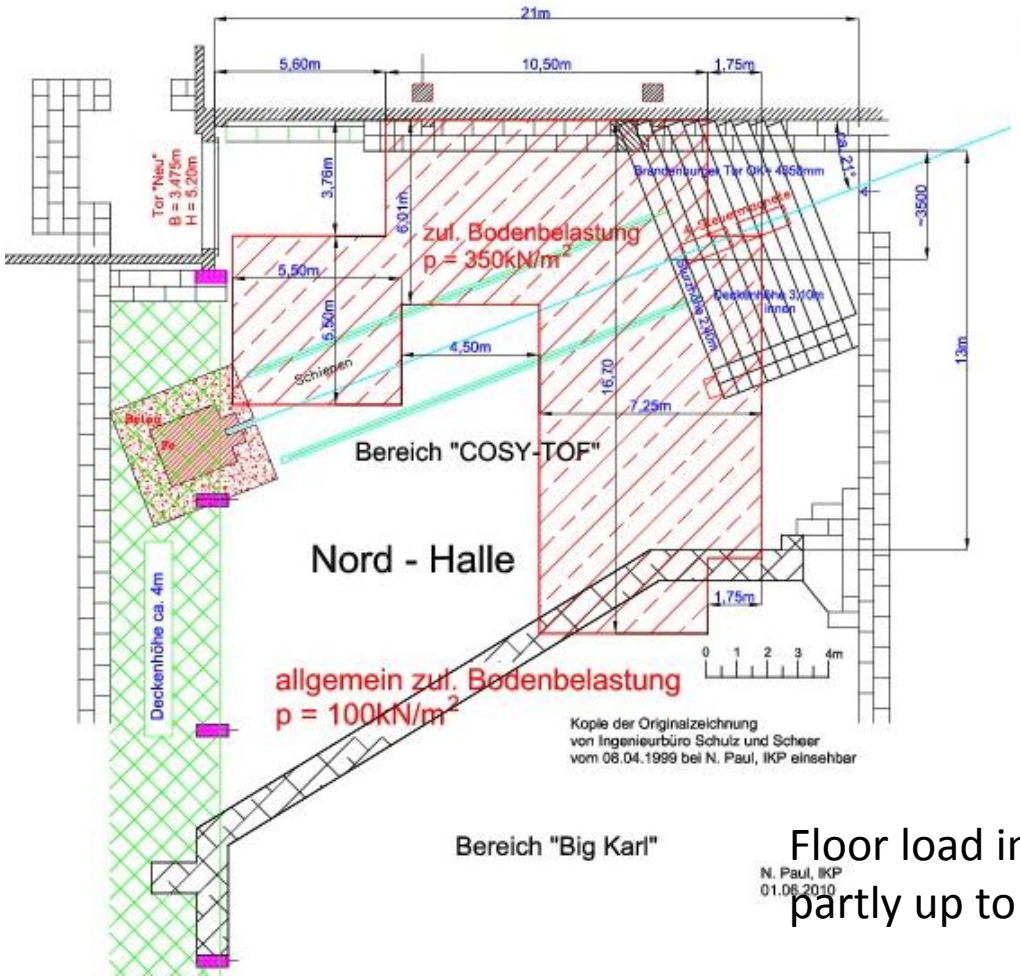
- **extracted beam:**
  - 10^5 ... 10^9 protons/s in spill
  - slow extraction: 10 s ... > 10 min spill, quasi-DC beam

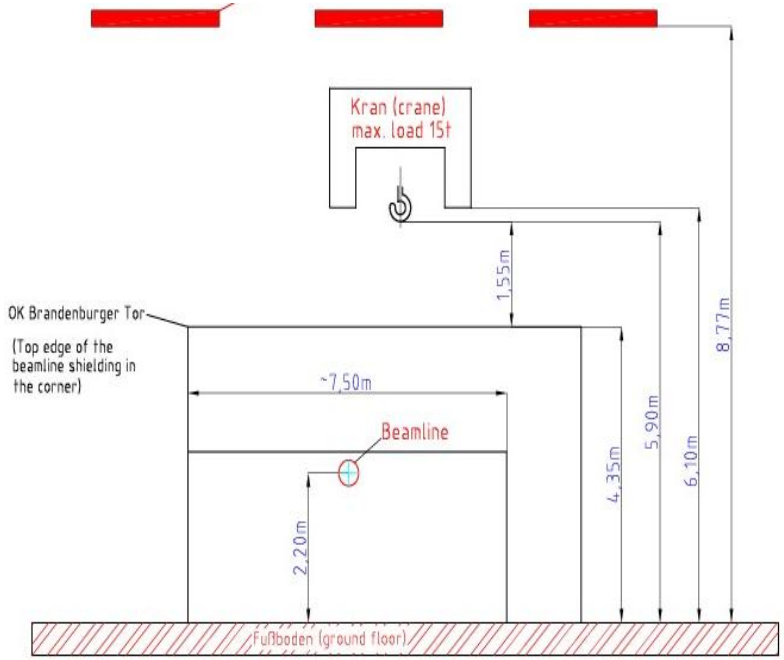
    10(5) s inter-spill (un)cooled
  - fast extraction: $2 \cdot 10^9$ protons in 200 ns, every 15 s

External beam areas



Infrastructure parameter external beam areas





Querschnitt Nordhalle (TOF)
(cross-section of the Nordhalle)

Floor load in hall: 100 kN/m²
partly up to 350 kN/m²

Infrastructure parameter external beam

Nord – Hall TOF:

4 elect. power plugs with 230V outlets
7 x 32A 400V socket
10 x 16A 400V socket
6 ports for exhaust air installation
Cold water supply 12 ºC to 16 ºC, upto 8 bar

Nord – Hall BIG KARL:

1 elec. power plug with 230V several outlets
2 x 32A 400V socket
2 x 16A 400V socket
1 port for power supply cooling water circuit (100kW, same circuit as COSY magnets)

JESSICA elec.room:

4 elect. power plugs with 230V outlets
3 x 32A 400V socket
11 x 16A 400V socket

JESSICA inside exp. area

2 elect. power plugs with 230V outlets :
2 x 32A 400V socket
4 x 16A 400V socket
Cold water supply 12 ºC to 16 ºC, up to 8 bar
Coupled to TOF and WASA exp.

beam time in 2012

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2012

Week	July 27	28	29	30	August 31	32	33	34	35	36	September 37	38	39
	02/07/12	09/07/12	16/07/12	23/07/12	30/07/12	06/08/12	13/08/12	20/08/12	27/08/12	03/09/12	10/09/12	17/09/12	24/09/12
Monday Tuesday Wednesday Thursday Friday Saturday Sunday	Maintenance	Maintenance	Maintenance	additional Maintenance for reconstruction of the transformer in 07.2	MD FAIR PANDA STT	FAIR CBM@ JESSICA MD	WASA (196.2)				MD (for TRIC)	FAIR beam dynamics, PANDA STT	TRIC (215)
					unpolarized protons								(un-)pol. P

Week	October 40	41	42	43	November 44	45	46	47	48	49	December 50	51	52
	01/10/12	08/10/12	15/10/12	22/10/12	29/10/12	05/11/12	12/11/12	19/11/12	26/11/12	03/12/12	10/12/12	17/12/12	24/12/12
Monday Tuesday Wednesday Thursday Friday Saturday Sunday	TRIC (215)	Maintenance	Maintenance	MD	TOF (193.2) >3.15 GeV/c				MD	TOF (193.2) 2.95 GeV/c	FAIR CBM@ JESSICA	FAIR Izotov, PANDA	Maintenance
	(un-)pol. P			polarized protons							unpolarized protons		
				electron cooling							MVD, STT		

2013

Week	January 2012 1	2	3	4	February 5	6	7	8	March 9	10	11	12	13
	31/12/12	07/01/13	14/01/13	21/01/13	28/01/13	04/02/13	11/02/13	18/02/13	25/02/13	04/03/13	11/03/13	18/03/13	25/03/13
Monday Tuesday Wednesday Thursday Friday Saturday Sunday	Maintenance	Maintenance	MD	WASA (214)	MD	EDM (176.6)	EDM Tests	EDM Tests	MD	ANKE (211.1)		MD	ANKE (212)
			unpolarized deuterons		polarized deuterons				unpolarized protons			polarized protons	

Week	April 14	15	16	17	May 18	19	20	21	June 22	23	24	25	26
	01/04/13	08/04/13	15/04/13	22/04/13	29/04/13	06/05/13	13/05/13	20/05/13	27/05/13	03/06/13	10/06/13	17/06/13	24/06/13
Monday Tuesday Wednesday Thursday Friday Saturday Sunday	ANKE (212)		Maintenance	Maintenance	MD	according to PAC decision		FAIR	MD	according to PAC decision		EDM tests	FAIR
	polarized protons												

Day-1 exp

Anticipated beam time allocation

YEAR	2012	2013	2014
for FAIR (hours/year)	1100	2000	2500

…increasing amount of beam time available in future!

Procedure for FAIR/EDM weeks

- These weeks are at the IKP directorate's discretion, but are reported to the PAC
- Cover sheet… http://www2.fz-juelich.de/ikp/cosy/en
- STT, PNPI Gachina, but also CBM, …

Executive summary for "Directorate Discretion Beam Time"

Collaboration _____

Spokesperson for test beam time: Name: _____

Address: _____

Is support from the LSF program of the EC requested? Yes No

Phone: _____ Fax: _____ E-mail: _____

Total number of particles and type of beam (p,d,polarization)	Momentum range (MeV/c)	Intensity or internal reaction rate (particles per second)	
		minimum needed	maximum useful
Experimental area JESSICA, Big Karl,...	Safety aspects (if any)	Earliest date of installation	Total beam time (No. of shifts)

What equipment, floor space etc. is expected from Forschungszentrum Jülich/IKP?

Description of experiment

Financial support for external EU user…

http://www2.fz-juelich.de/ikp/tmr-life.html

EU-regulations apply:

- eligible group leader is needed for the project (from EU/assoc. member state)
- group has to be composed of external EU collaborators in majority
- To this e.g. Russia is not considered.
  nevertheless, when the majority of activists is from EU, it is possible to support also people from Russia

readiness for pre-assembly

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Number of issues to be addressed

- space requirements
- staging (e.g. availability of other detector components)
  - which detector will come when?
- Status and time planning of mechanical construction;
- Status and major results of prototype performance evaluations;
- Status and time planning of engineering drawings;
- Availability of crucial detector components;
- Status and time planning of the readout system;
- Specific goals of the pre-assembly:
  - which systems integrated subsystems have to function together;
  - which results are expected from the pre-assembly or system tests.

Sourcing human, financial and material resources need input asap