



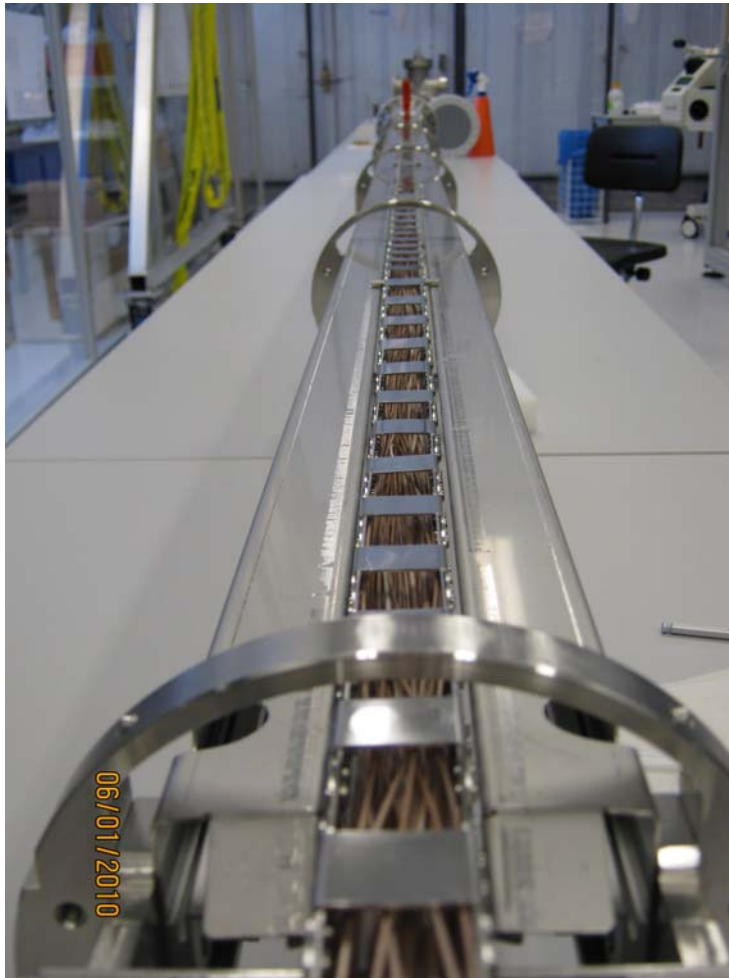
# Clean Room and Lock System

## Status report and





# Commissioning Lock



Commissioning lock was fully mounted on 13<sup>th</sup> of January 2010





# Commissioning Lock



Tests of cable behavior started immediately. Test volume flushed with dry nitrogen gas. Measured Class 1.000 surrounding



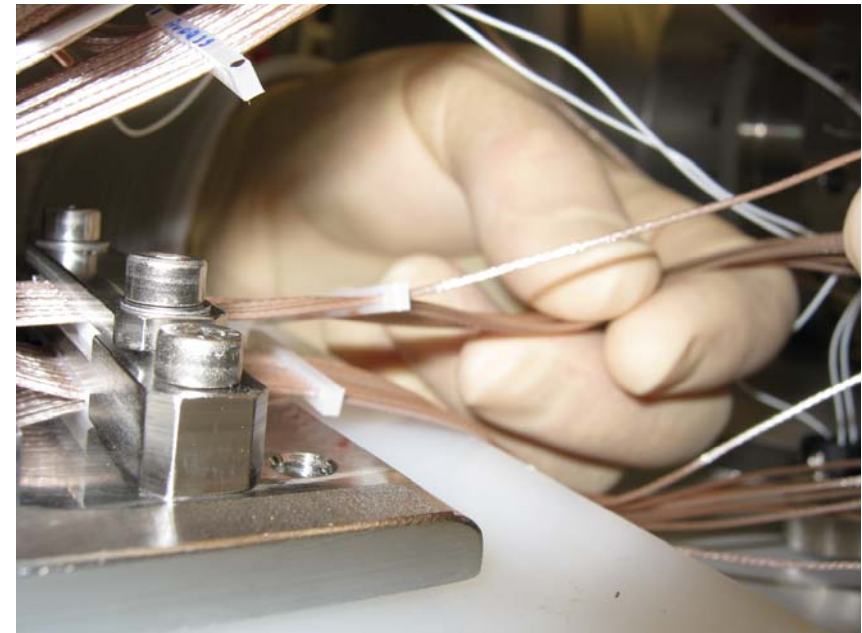
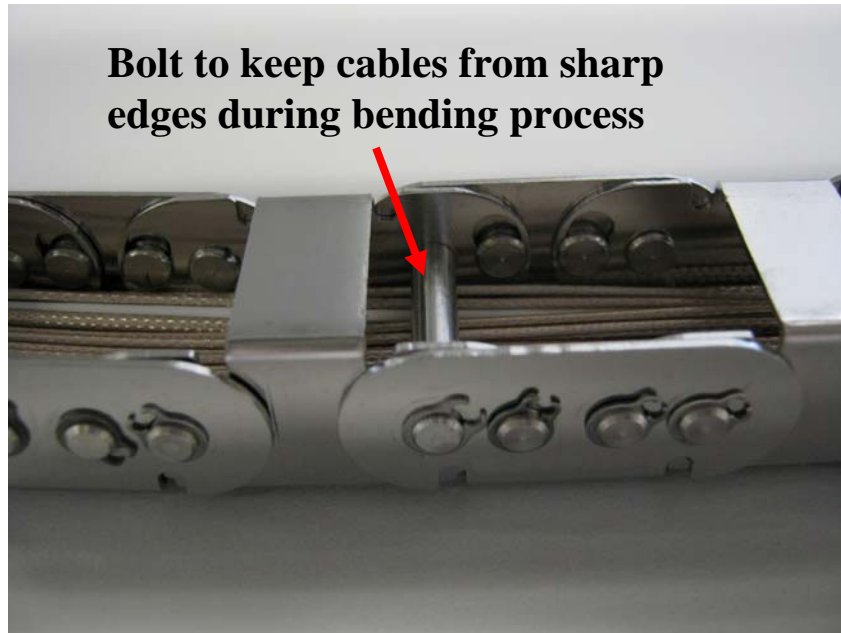
## Commissioning Lock



After few cycles cables started moving out from cable chain. At mounting cables had not been tightened much  
→ Cable rearranged during movement and were damaged, partly at sharp edges of cable chain



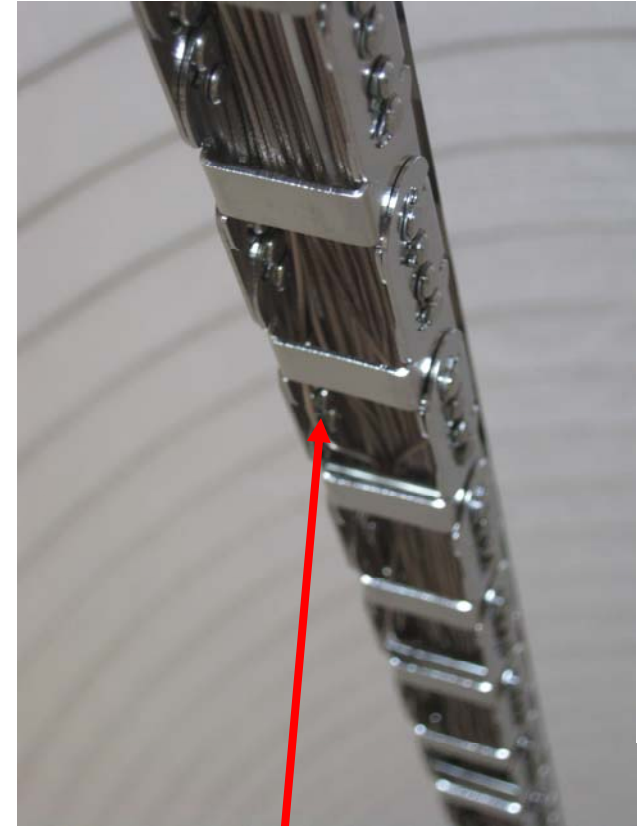
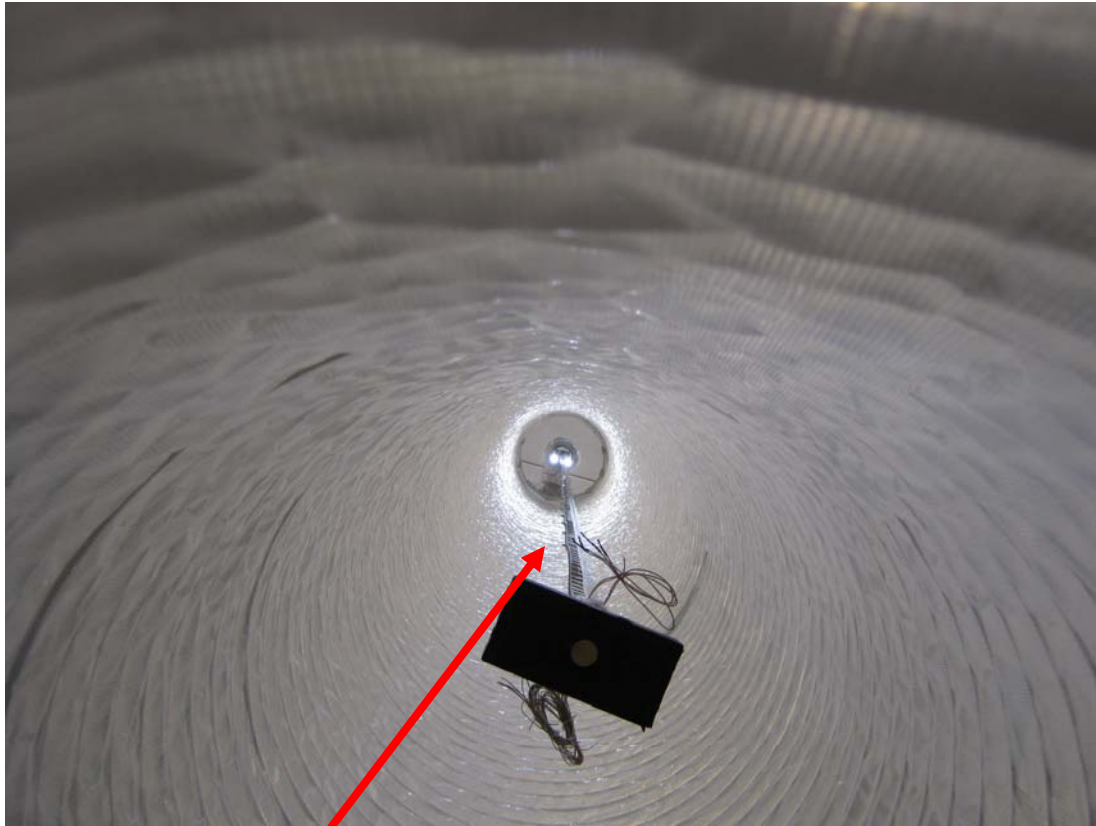
# Commissioning Lock



Did complete remount (including laser welding to matrix).  
Introduced bolts to keep cables from sharp edges.  
Tightened cables properly.  
→ Commissioning lock back on hoist on 12<sup>th</sup> of February



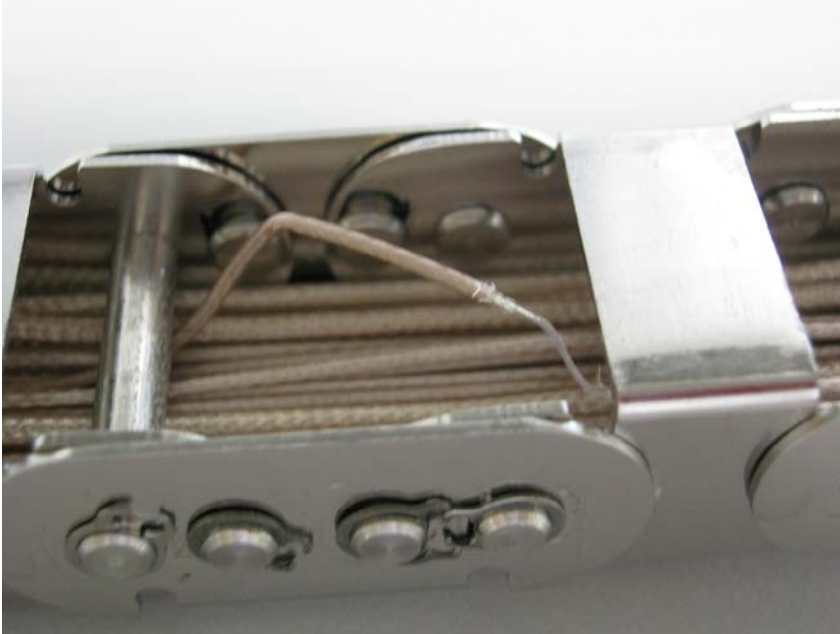
# Commissioning Lock



Let done cable chain on 15<sup>th</sup> of February.  
Cable chain not straight. Cables started moving out of chain anyway



# Commissioning Lock



After one cycle: Two broken cables, many scratched.  
The system had been cycled 20 times before without seeing this problem.  
However, no bolts and half the amount of cables was installed.



# Commissioning Lock



## Conclusion:

- The amount of cables was too high
- The bolts are counterproductive with respect of functionality of the cable chain
- The edges of the cable chain are too sharp

## Actions taken:

1. Remove half the cables. Bypass cables only!
2. Chamfer sharp edges
3. Bundle cables in spiral coiled tube
4. Leave loop before strain relief

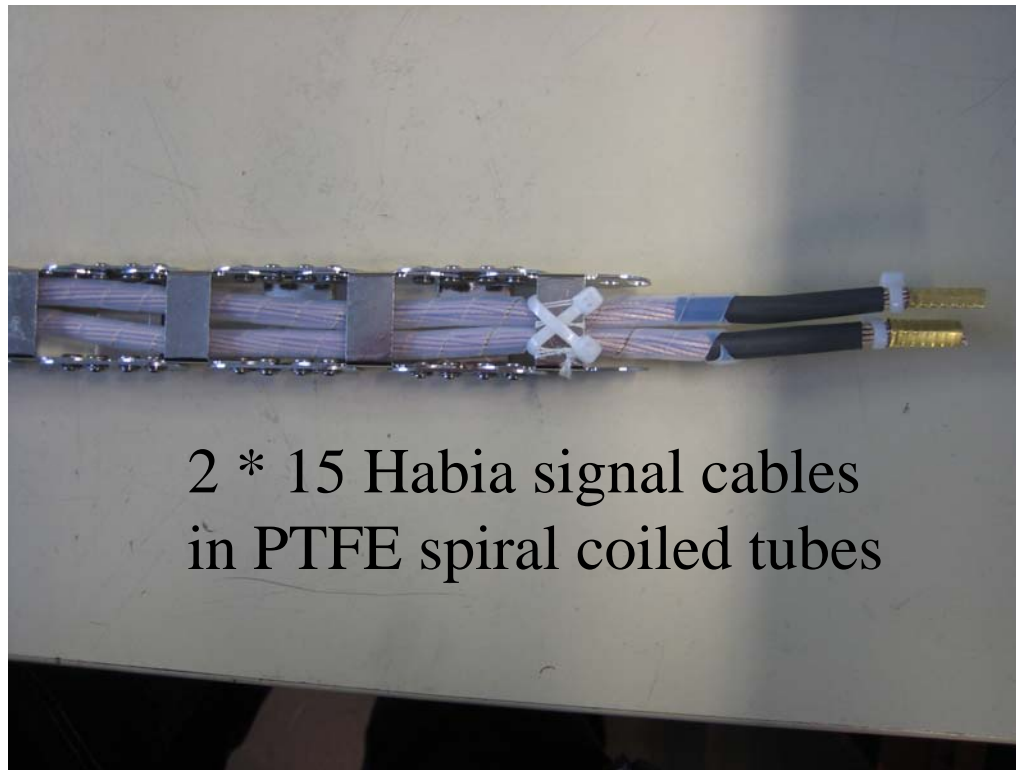






# Commissioning Lock

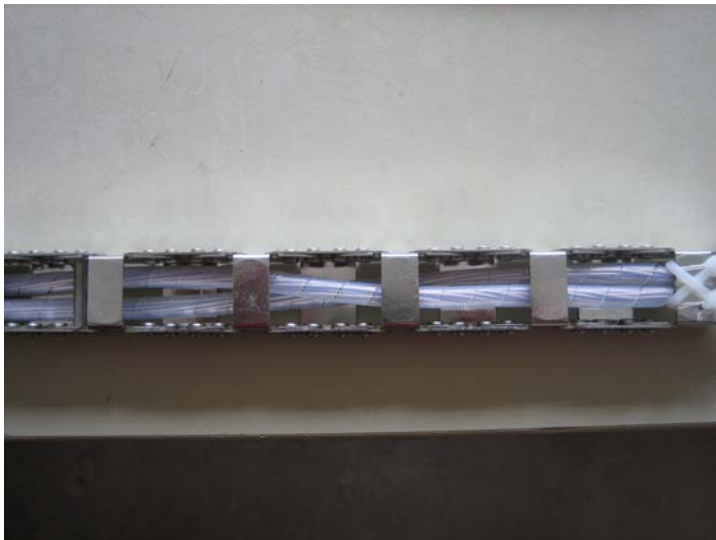
## Actions Taken:



- 20 LN cycles with subsequent 10 bending cycles each without bolts
- 10 bending cycles with bolts



# Commissioning Lock



→ Damage of PTFE spiral coiled tube

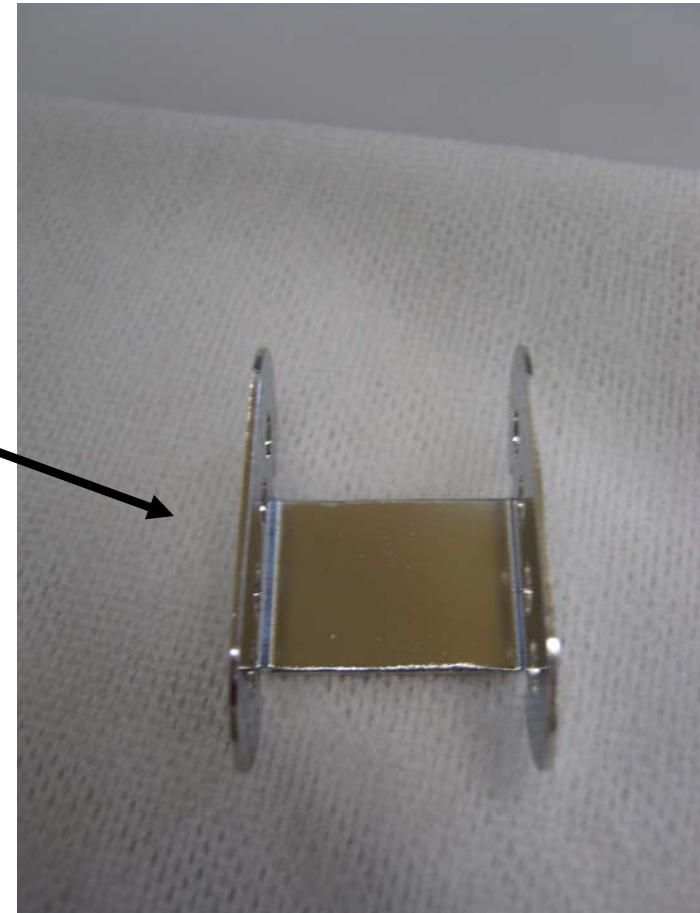
→ Movement of spiral coiled tube

→ Winding of bundles



# Commissioning Lock

## Actions Taken:



**Removed sharp edges of cable segments**



# Commissioning Lock

## Actions Taken:



**Redesigned bolts**

→ Cable bundles can freely move inside cable chain



# Commissioning Lock

## Actions Taken:

4	2	Senkschraube	ISO 2009 - M2,5 x 12 - A2 ip1	A2		ISO 2009	
3	1		Cu-Kette-Teil1-Befestigung.ip1	Cu-Leg			
2	1	Klemme Zugentlastung	37060803.ip1	1.4301 X5CrNi18-10			
1	1	Zugentlastung Kette	37060802.ip1	1.4301 X5CrNi18-10			
Teil	St.	Benennung	Zeich. Nr.	Werkstoff	Abmessung	NORM	Bemerkung

STÜCKLISTE

A-A (1:1)

90°

2x Senkung im Kettenglied zur Befestigung

Ø4

Ø5,6

Nur zur Information!

Hauptprojektion		MAX-PLANCK-INSTITUT FUER PHYSIK MUENCHEN (VERNER-HEISENBERG-INSTITUT)		Gewicht: .....	kg
Tag		Name		Dimensionen: mm	
gezeichnet		Projekt		Maße ohne Toleranzangabe nach DIN ISO 2768 - mK	
geprüft		GERDA		Werkstoff	
geplant		Commissioning Phase		Zeichnungsnummer / EDV Nr.:	
Maßstab		Kabelfixierung Matrixseite		37060800.idw	
1:1 (2:1)		Teil		Software... Inventor 8	
				Blatt: 3 Gesamtzahl: 3	
				V09.h	

12	2	Scheibe	DIN 125 - A 4,4 - A2 ip1	A2		DIN 125	
11	2	Sackkantmutter	ISO 4032 - M6 - A2 ip1	A2		ISO 4032	
10	2	Sackkantmutter	ISO 4032 - M4 - A2 ip1	A2		ISO 4032	
9	2	Innensechskantschraube	ISO 4762 - M5 x 12 - A2 ip1	A2		ISO 4762	
8	2	Innensechskantschraube	ISO 4762 - M4 x 12 - A2 ip1	A2		ISO 4762	
7	4	Innensechskantschraube	ISO 4762 - M2,5 x 12 - A2 ip1	A2		ISO 4762	
6	1	Kabelausricher oben	37060807.ip1	1.4301 X5CrNi18-10			
5	1	Kappe Kabelausricher	37060806.ip1	1.4301 X5CrNi18-10			
4	1	Verlängerungsplatte	37060805.ip1	1.4301 X5CrNi18-10			
3	1	Zugentlastung oben	37060804.ip1	1.4301 X5CrNi18-10			
2	1	Klemme Zugentlastung	37060803.ip1	1.4301 X5CrNi18-10			
1	1	Zugentlastung Kabel mit Kette	37060802-007.idw				
Teil	St.	Benennung	Zeich. Nr.	Werkstoff	Abmessung	NORM	Bemerkung

STÜCKLISTE

Kabel kann hier durchgleiten

Platz für Kabelschlaufe

30mm Platz zum Auffächern der Kabel

Kabel hier fixiert (Bohrungsdurchmesser kleiner)

Zusätzliche Befestigung der einzelnen Kabelletzen unten

Nur zur Information!

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Tag		Name		Dimensionen: mm	
gezeichnet		Projekt		Maße ohne Toleranzangabe nach DIN ISO 2768 - mK	
geprüft		GERDA		Werkstoff	
geplant		Commissioning Phase		Zeichnungsnummer / EDV Nr.:	
Maßstab		Kabelfixierung Oben		37060800.idw	
1:1 (2:1)		Teil		Software... Inventor 8	
				Blatt: 3 Gesamtzahl: 3	
				V09.h	

### Redesigned strain relief





# Commissioning Lock

## Actions Taken:

- ✓ - Redesign bolts for cable chain (Until Mid CW8)
- ✓ - Redesign strain relief for cable bundle (Until end of CW8)
- ✓ - Remount cable chain (until end of CW8)
- Redesign strain relief
- Produce strain relief for cable bundles inside spiral coiled tube (Beginning of CW9).
- Remount lock (CW9)
- Testing newly mounted lock (CW10)
- Shipment to LNSG CW11
- ✓ - Test Spiral coiled tube to mount 30 Habia cables and 10 HV cables (end of CW8)
- For 3 string arm two bundles will be used. They will be separated by additional guide laser welded to individual segments





# Clean Room Status



**Clean room has been cleaned. Not perfect, but please respect clean room rules from now on.**

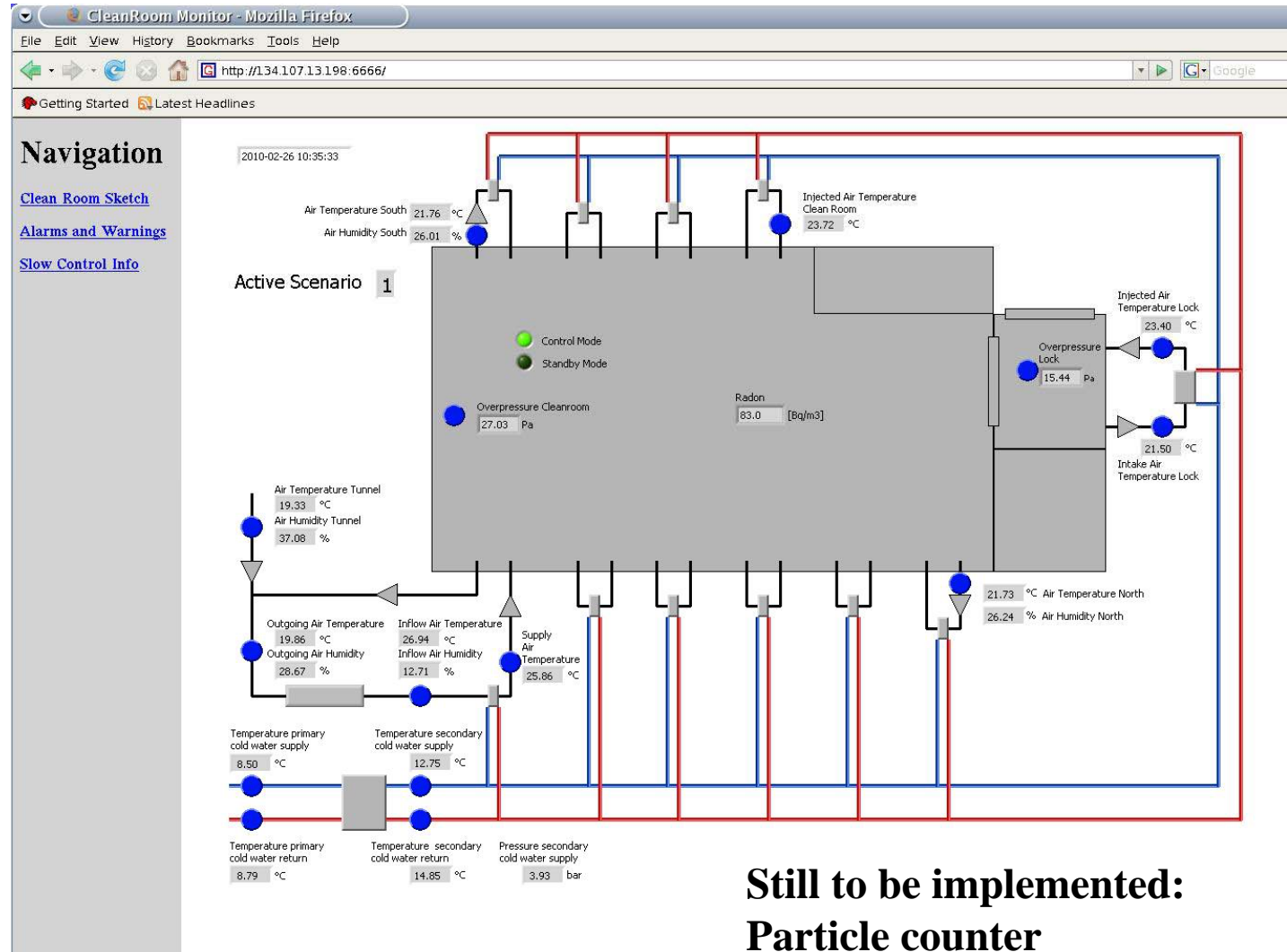
**→ Presentation, Discussion and training of rules on Wednesday**





# Clean Room Status

**Clean room Monitor is online.**  
**Please note: not the final IP address yet!**



**Still to be implemented:  
Particle counter**

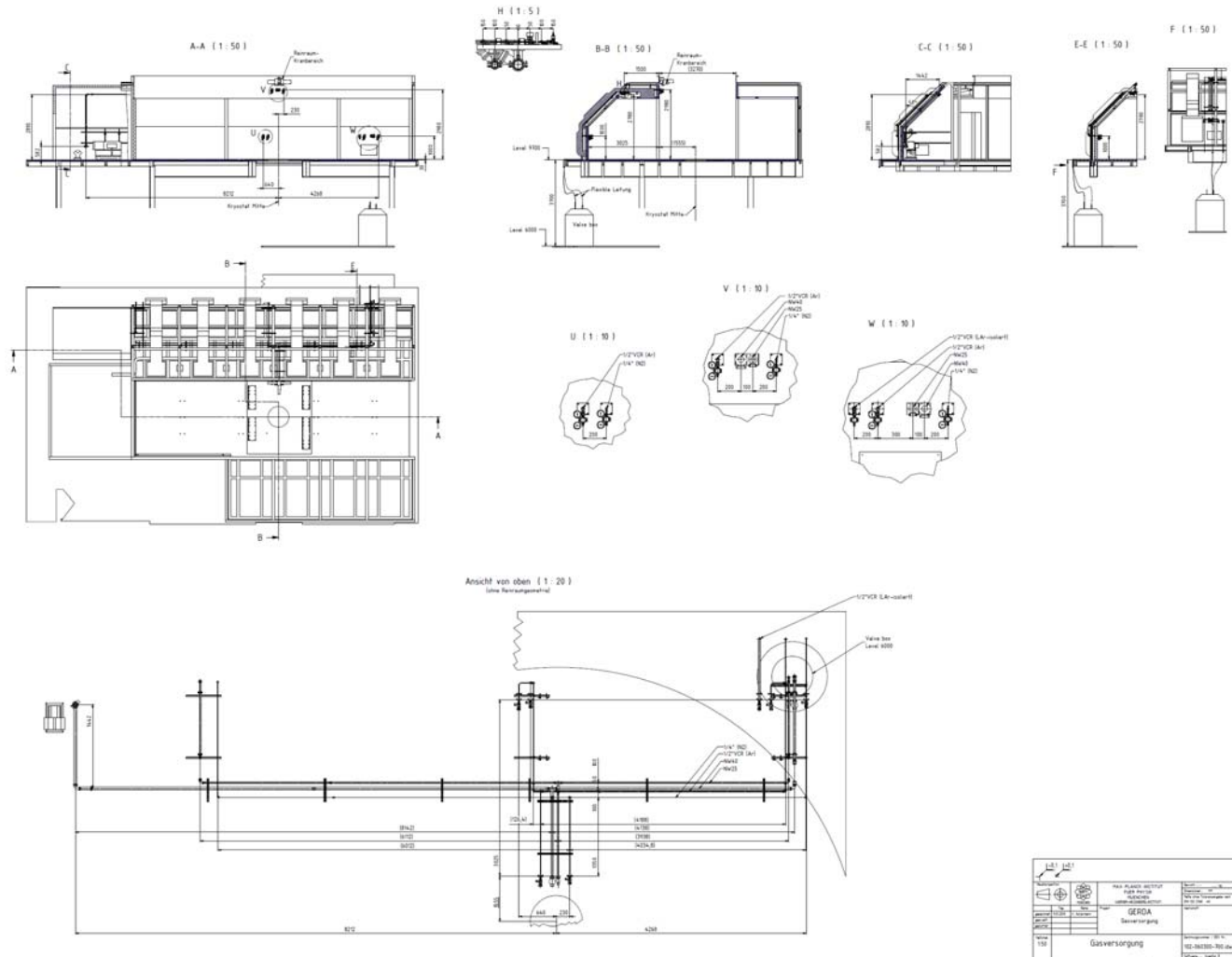


<http://134.107.13.198:6666>





# Clean Room Status



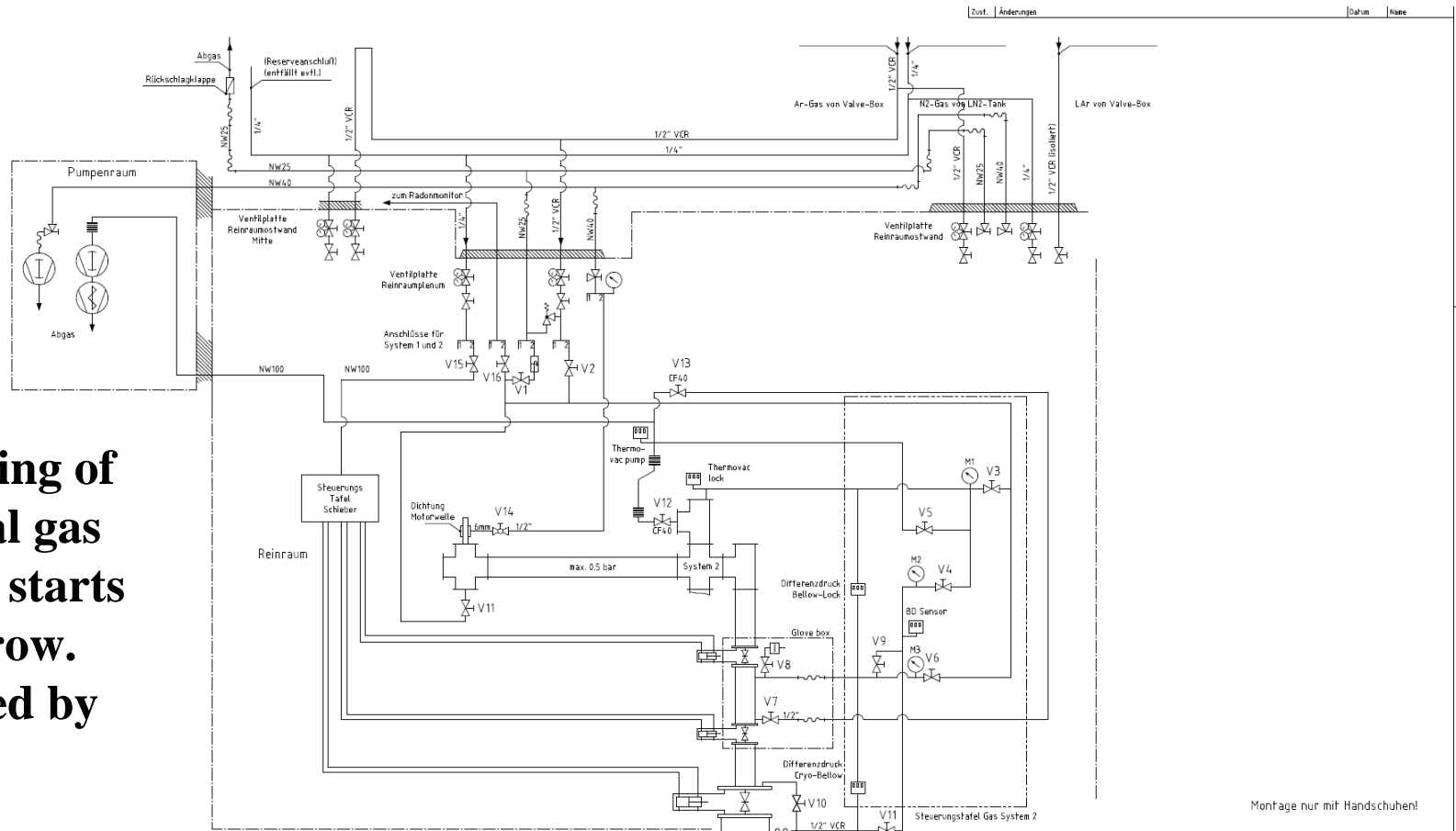
**Mounting of external gas and vacuum supply is going to be mounted by Linde. Will be finished CW10 (?).**





# Clean Room Status

Mounting of internal gas system starts tomorrow. Finished by CW 10



nick-Sensor mit 1/4" VCR female oder male  
Hfrenzdrucksensor mit 2x VCR 1/4" male

- Schieberpneumatikzyl. inkl. 2 Rückschlagventile
- Flexible Leitung
- Bag / Kompensator
- Vakuumpumpe Wälzkolben
- Vakuumpumpe Schraubenverdichter

- Schieberventil
- Standardventil
- Sicherheitsventil
- Membrantriebventil
- Standardventil (Auf/Zu)
- Kugelhahnventil (Auf/Zu)

- Bubbler
- Rückschlagklappe
- digitale Vakuummessung
- Druckmessung
- Vakuummessung
- Druckreglung (MS-vent) Eingangsdruck max. 20bar Druckregelbereich 0 bis 10bar

- 1/4" = N2-Gas-Leitung
- 1/2" = Ar-Gas-Leitung
- NW25 = Abgas-Leitung
- NW40 = Vakuum-Pump-Leitung
- NW100 = Schleuse- Pump-Leitung
- CF-Flansche mit Cu-Dichtung /KF-Flansche mit NBR
- Leitungsverbindungen 1/4" AD mit Parker-Klemmring
- Leitungsverbindungen 1/2" AD mit VCR

Montage nur mit Handschuhen!

				<b>GERDA</b> Gasversorgung		Dimensiones : mm Masse ohne Toleranzangabe nach DIN ISO 2768 mk	
Tag 08.12.2009	Name Ackermann	Projekt MAX-PLANCK-INSTITUT FUER PHYSIK MÜNCHEN (WERNER-HEISENBERG-INSTITUT)		Werkstoff		Zeichnungsnummer / EDV Nr. 102-060399.dwg	
gezeichnet geprüft geplant		Massstab 1:1		Fluidplan Reinraum		Software:AutoCAD2002/MDTpp 6 Blatt : 1 Gesamtzahl : 1	
DIN EN 20 216 - A2 (4:20 x 594)							





## Conclusions:

- **Commissioning Lock will hopefully installed this month start after loads of trouble.**
- **Infrastructure close to being complete.**
- **Before its getting boring, we will start installing the final lock. Cylinder is on its way**



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5) Received protective PTFE spiral coiled tube for cable bundle

- a) Hellerman Tyton 4mm inner diameter 5m length
- b) EAP 4.5mm inner diameter 10m length

6) Tested spiral coiled tube:

Two spiral coiled tubes with 15 Habia cables each were inserted into a 2m long cable chain segment that had not been chamfered.

The Cable bundles were strain relieved on one side of the cable chain. The second one was left open. One of the bundles was made out of two 1m pieces of spiral coiled tube.

a) 20 LN cooldown cycles, after each cooldown 10 bending cycles at close to LN temperature

--> No damage observed

--> Winding of the two spiral coil tubes

--> Spiral coiled tube increased its length on the not strain relieved side on one of the cable bundles

b) Inserted bolts each 7th segment pressing the spiral coiled tubes with Habia cables onto the sharp edge of the cable chain Did 20 bending cycles

--> Scraping on the PTFE spiral coiled tube

--> No damage on the Habia cables

