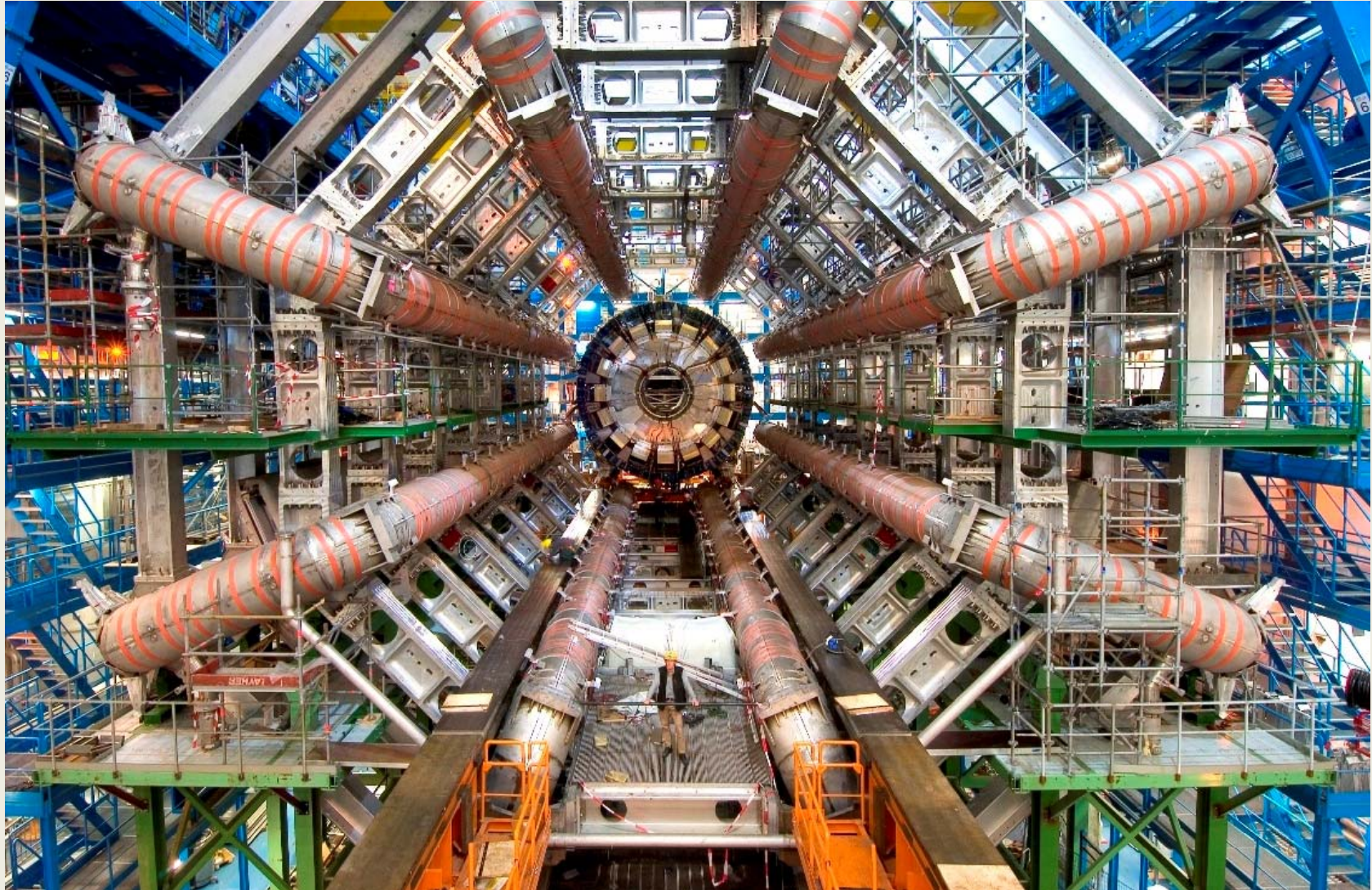


ATLAS VACUUM SYSTEM



Xavier Pons on behalf of PH/DT and Atlas Magnet Sections

Why vacuum is needed?



To keep thermal isolation between atmosphere temp. and cryogenic temp. of the magnet

SIMPLIFIED VIEW OF ATLAS VACUUM SYSTEM.

PCS
PROXIMITY CRYGENICS SYSTEM



ECT-C
END-CAP SIDE C



BT
BARREL TOROID



ECT-A
END-CAP SIDE A



ROUGHING/BACKING LINES



PRIMARY PUMPS

Main Parameters or What do we pump?

- ECT Vacuum Vessel: Volume 220 m³ , Surface 400 m²
- Cold mass : Surface 900 m²
- Double O-ring length 130 m and 25 ports equivalent to DN250 (20 m) and hundred of small ports

- BT Vacuum Vessel: Volume 310 m³, Surface 1200 m²
- Cold mass (5 K): Surface 1100 m²
- 80 ports equivalent to DN250, 40 ports equivalent to DN630 with total length of 180 m and hundreds of small

Total with PCS:

- **800 m³ of Volume to be kept at 10⁻⁴ mbar or less**
- **2000 m² of “dirty” surface to outgas**
- **3000 m² of Cold Al Surface as cryopump**
- **4 m² of Viton with its outgassing and permeation**

PUMPING TYPE

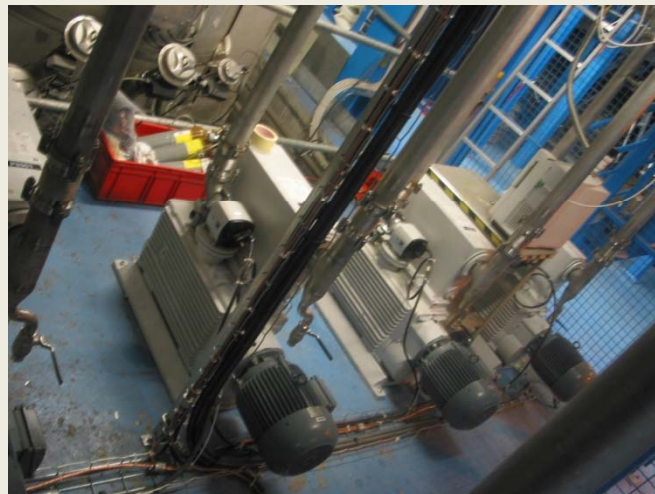
- First layout by Rutherford institute
- Optimized by CERN
- Support from Koln University
- Mechanics by old AT/ECR and PH/ATT
- Instrumentation and controls by PH/DT-DI

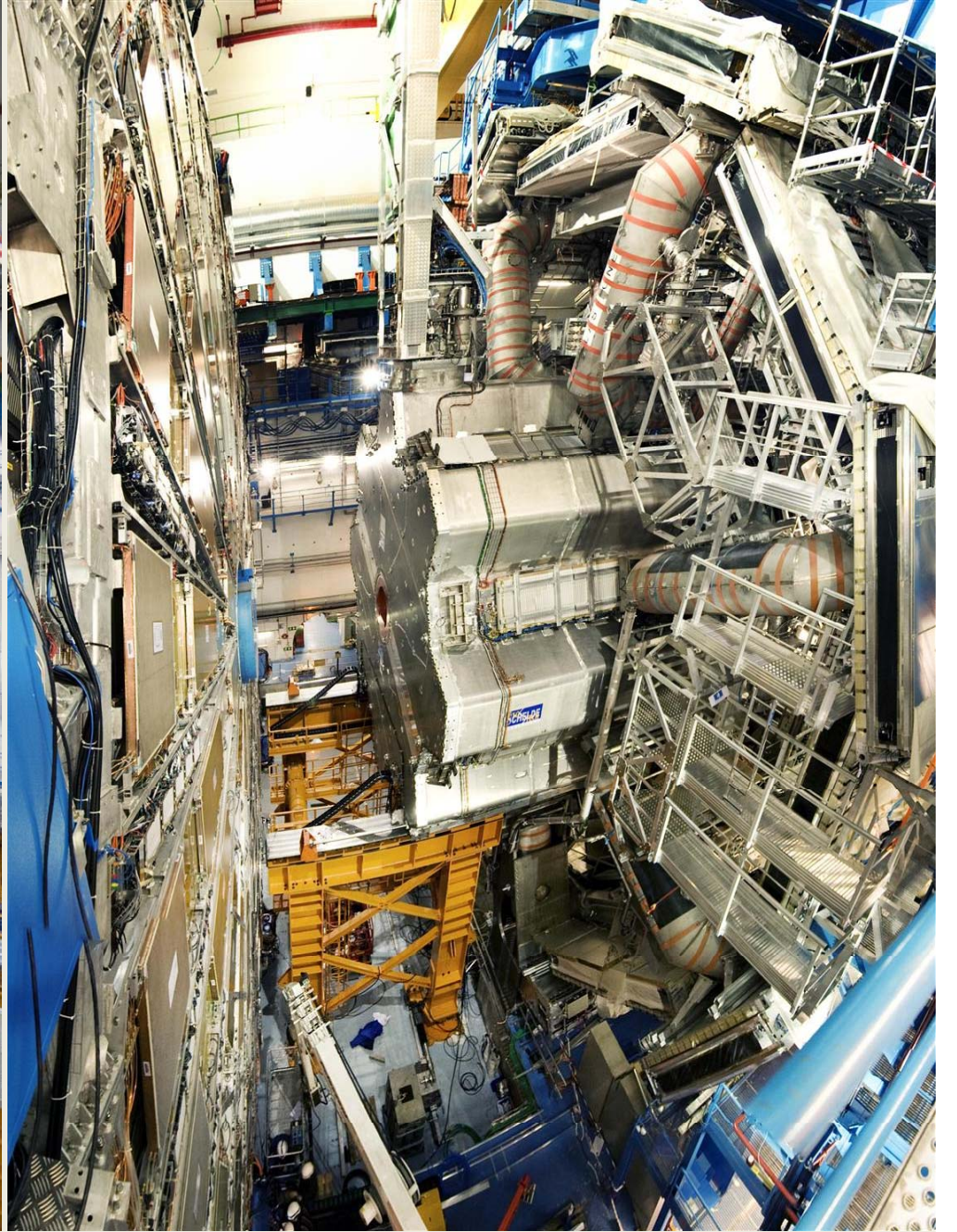
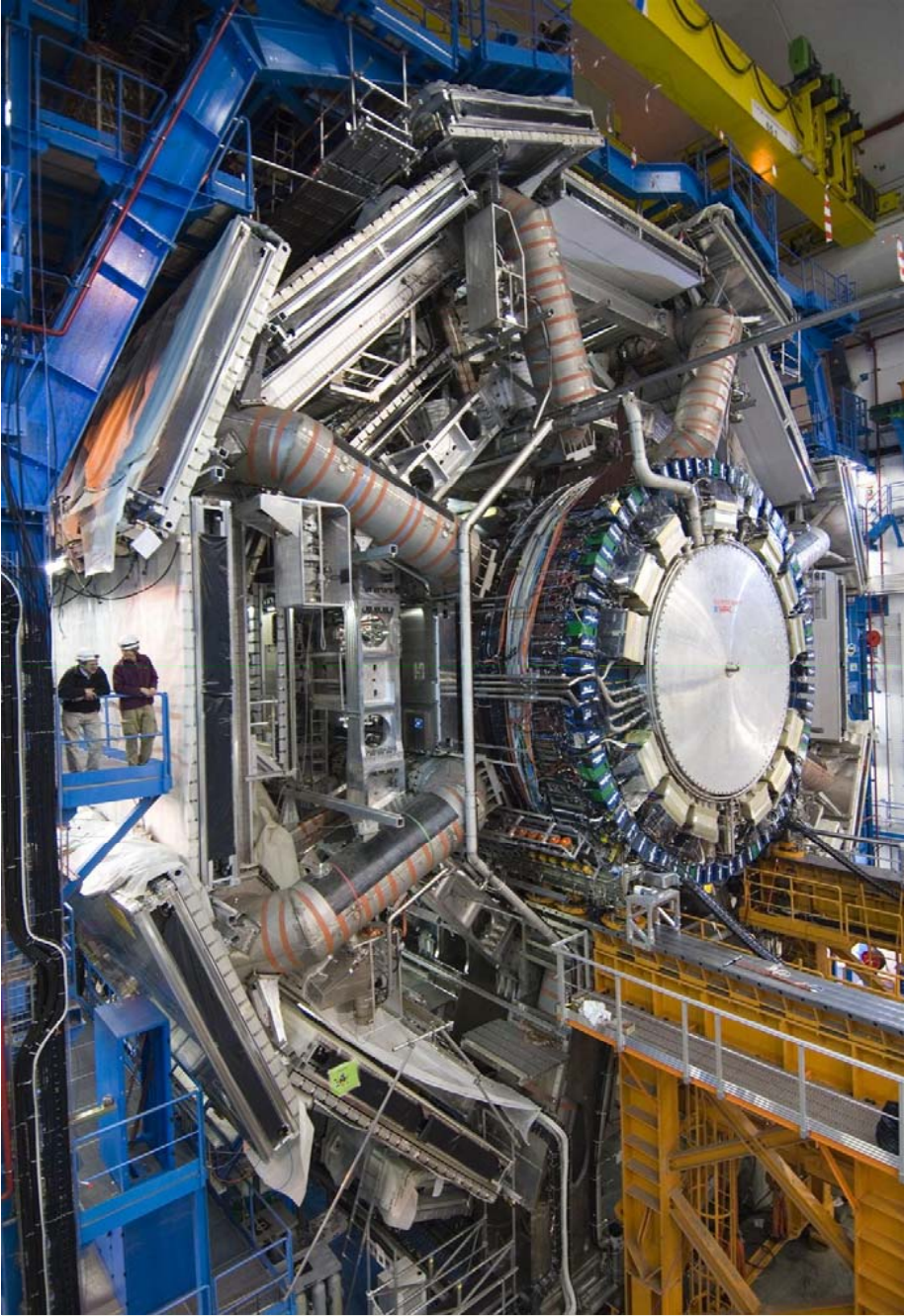


- Pumping type by diffusion pumps (specific production for Atlas.)
- With primary pumps

CONTROL SIDE

- Total 21 diffusion pumps.
- 21 DN160 Gate valves
- 40 corner valves
- 5 Primary pumps
- 60 Vacuum pressure readings
- 60 Temperature readings
- 4 control racks
- 1 power cabinet
- Schneider PLC + PVSS supervisor
- 180 AI, 260 DI, 320 DO





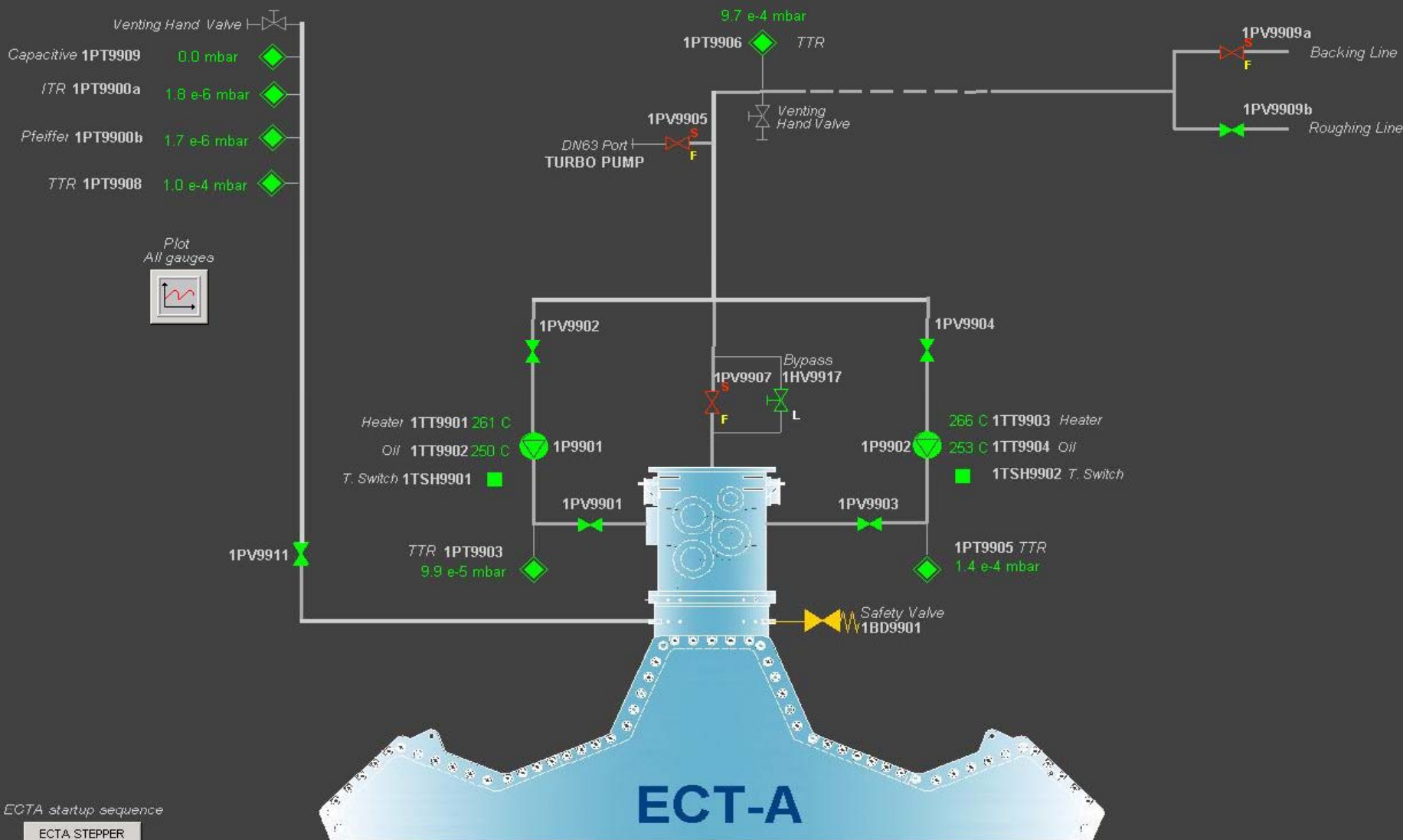


ATLAS TOROIDS VACUUM

System Status

15:50:40 16-Feb-2009

L	Bad	2009/02/12 14:04:38.310	X211_003010_DO_4_6_14ON	SPARE DO generic 2.24VDC po	X211	ONOFF	Stop Interlock Status	TRUE	xxx	S	13 / 13	0 Unack.
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ECTA startup sequence

ECTA STEPPER

Remaining time	object:	Select	
L	2009.02.16 15:50:35	INFO	Valve widget is not linked to database in panel _User_Panels/ECTA_closeup.pnl
T	2009.02.16 15:50:35	INFO	Valve widget is not linked to database in panel _User_Panels/ECTA_closeup.pnl

VACUUM SYSTEM AS MAGNET SAFETY

- Vacuum system non-stop working. 3 years already pumping 24 h/day, 365 day /year.
- Redundancy applied as much is possible
 - Cooling Station from EN/CV
 - Pneumatics, 2 compressors+buffer+battery
- Controls under UPS
- Electrical power under magnet diesel (1MW), controlled by EN/EL, supervised by us.
- In case of vacuum break, VHS (Vacuum Heater System) enabled => 750 kW of heat power over toroids surface, under diesel

MAGNET CONTROL ROOM WHEN MAGNET REACHED NOMINAL FIELD 10/2006

