CERN infrastructure

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All information available at
http://cern.ch/proj-hiptarget

Experimental requirements

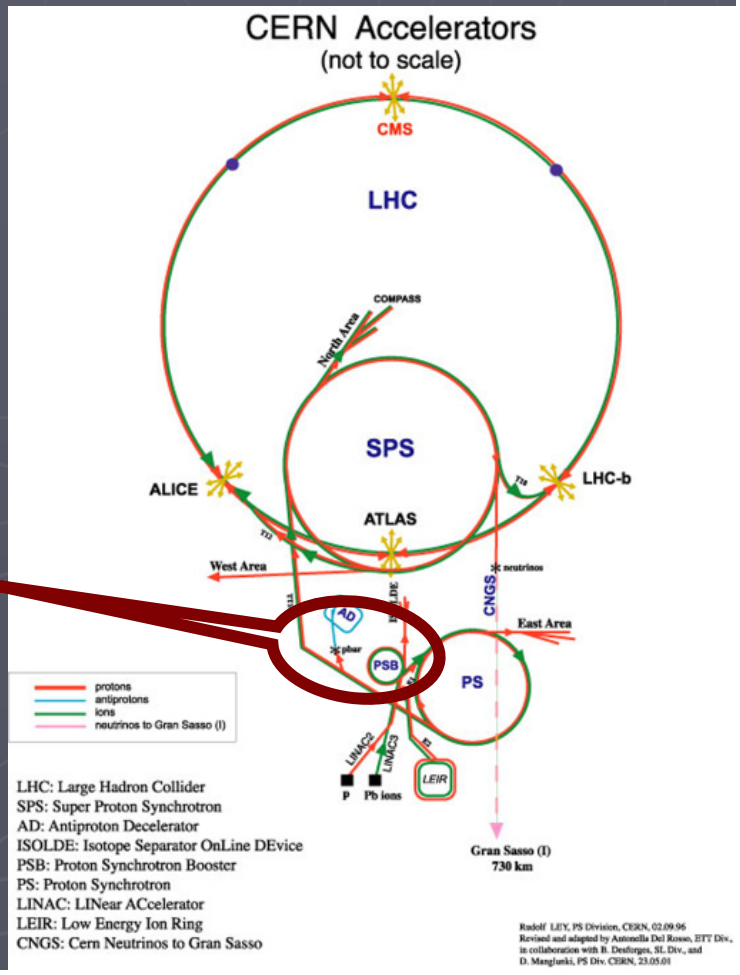
What CERN could provide?

- Primarily a technical review
- Cost/ estimates exist, but no official CERN management confirmation of availability and support

- Space
- Beam
- Support on
  - installation
  - Cryogenics
  - solenoid power
  - Safety

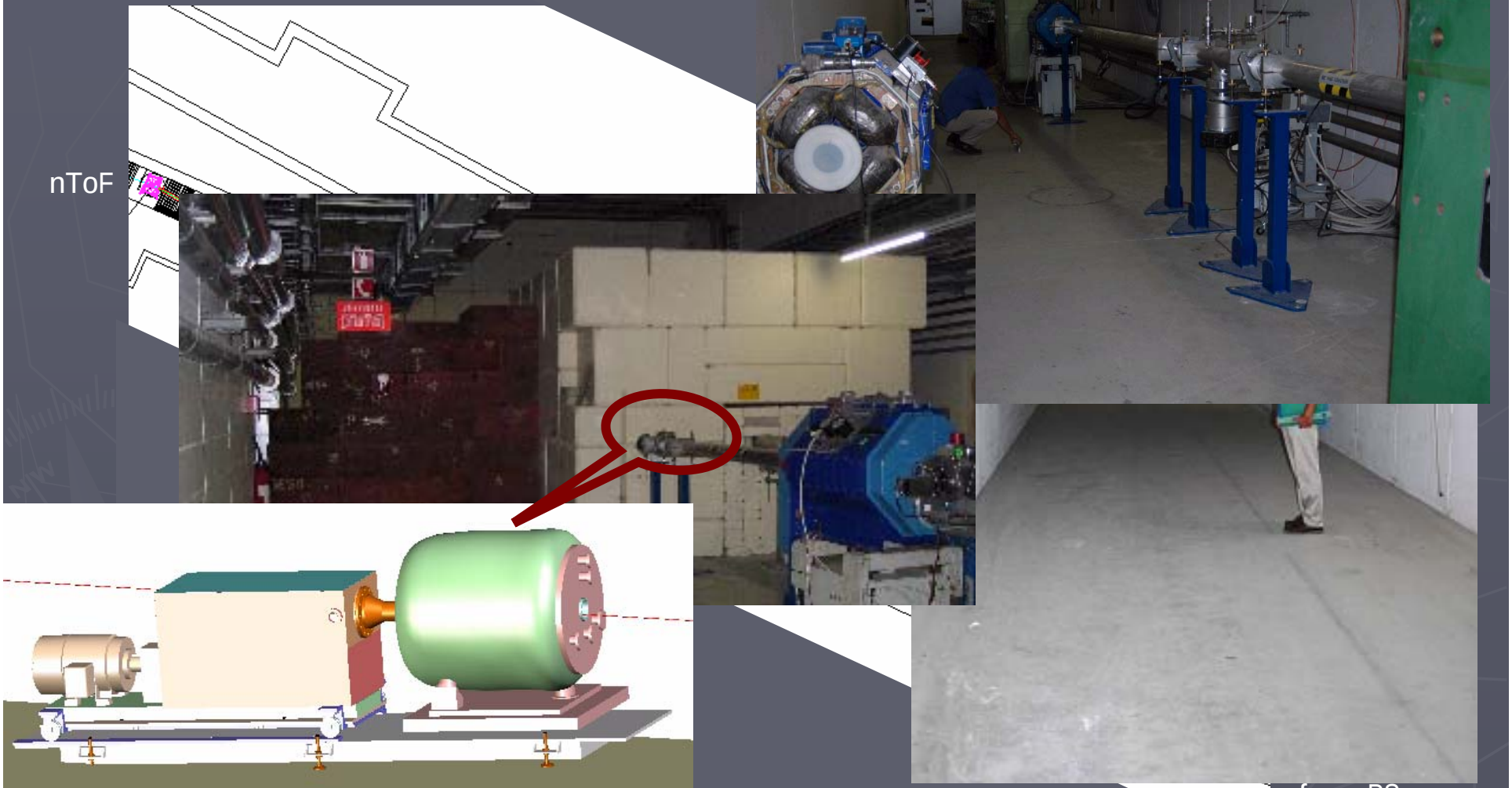
CERN accelerator chain

- TT2 – transfer tunnel from Proton Synchrotron to AD, SPS
- TT2A – PS transfer line to nToF



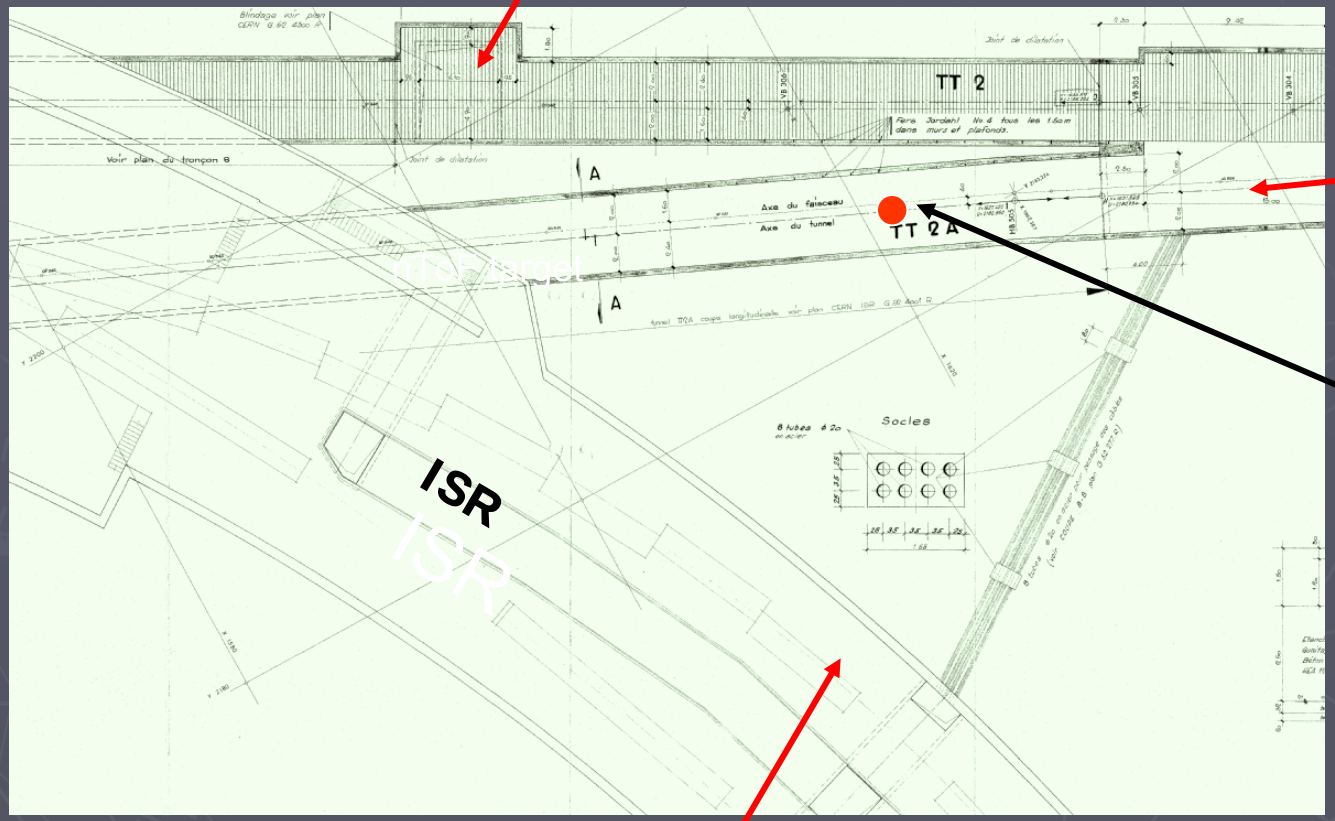
TT2A

nToF



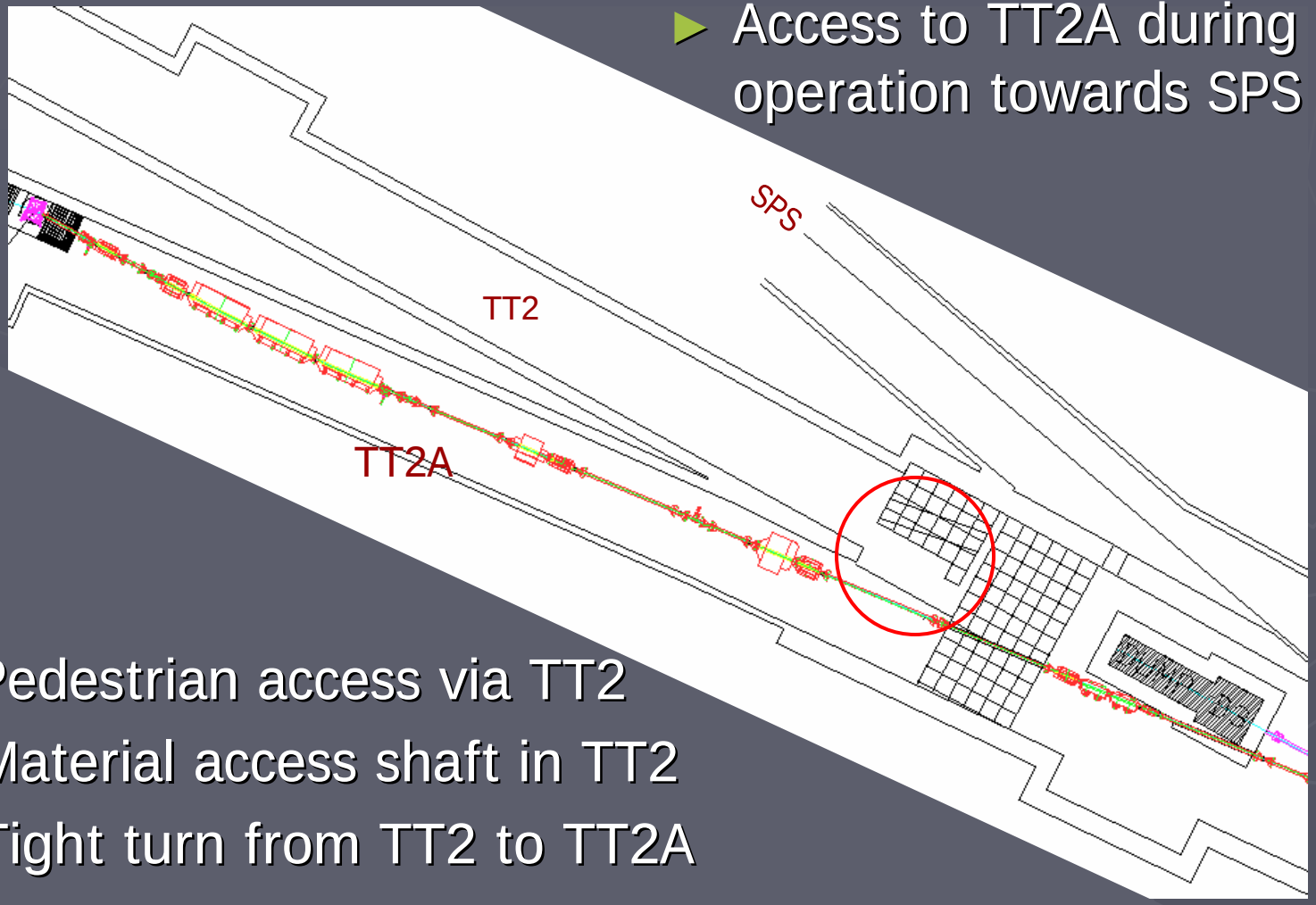
from PS

Periphery


LN2 supply
Power supply
PS beam
TT 2
TT 2A
Axe du faisceau
Axe du tunnel
Joint de dilatation
Voir plan du tronçon 8
Socles
ISR
Solenoid
Mercury circuit
Diagnostics
SAFETY
Control room

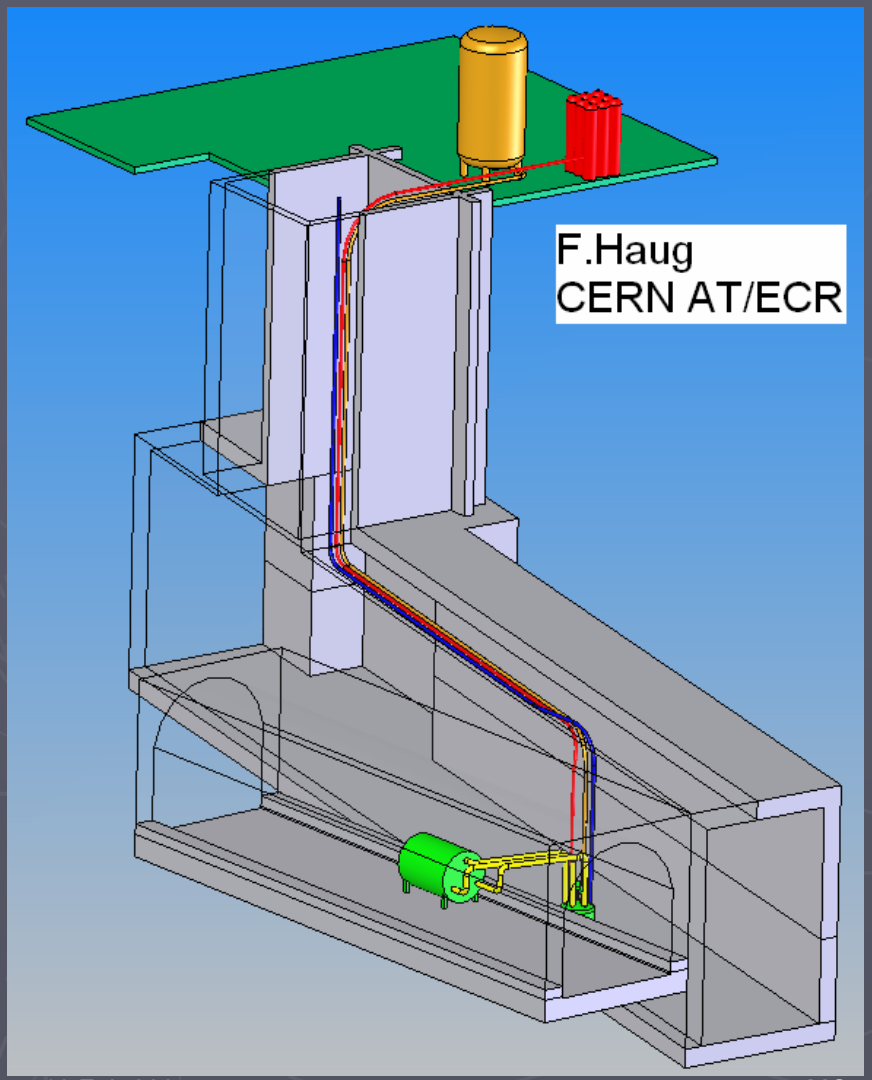
Access & transport

- Access to TT2A during PS operation towards SPS possible

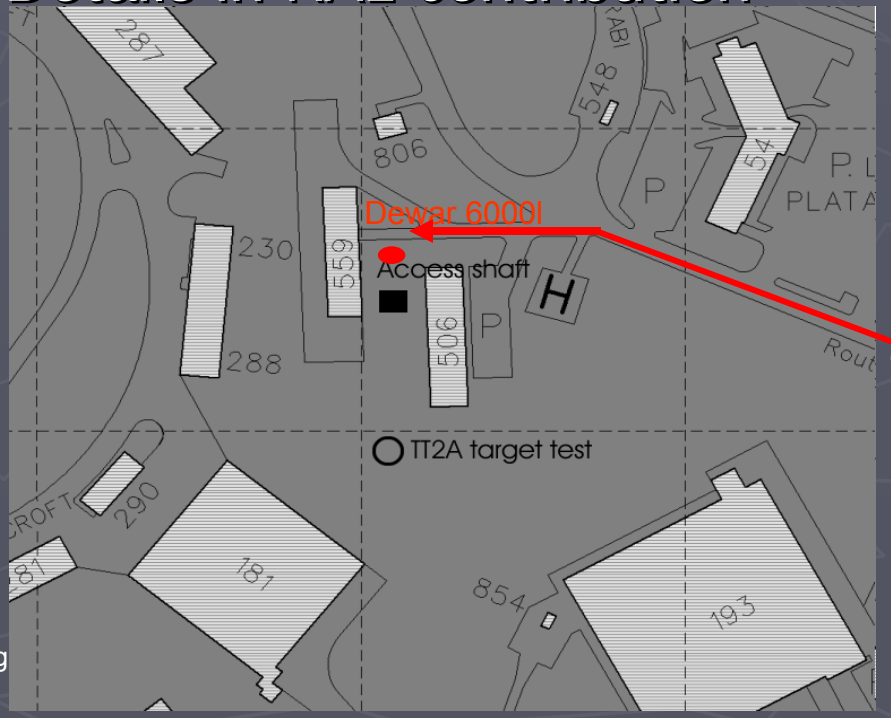


- Pedestrian access via TT2
- Material access shaft in TT2
- Tight turn from TT2 to TT2A

Cryogenics



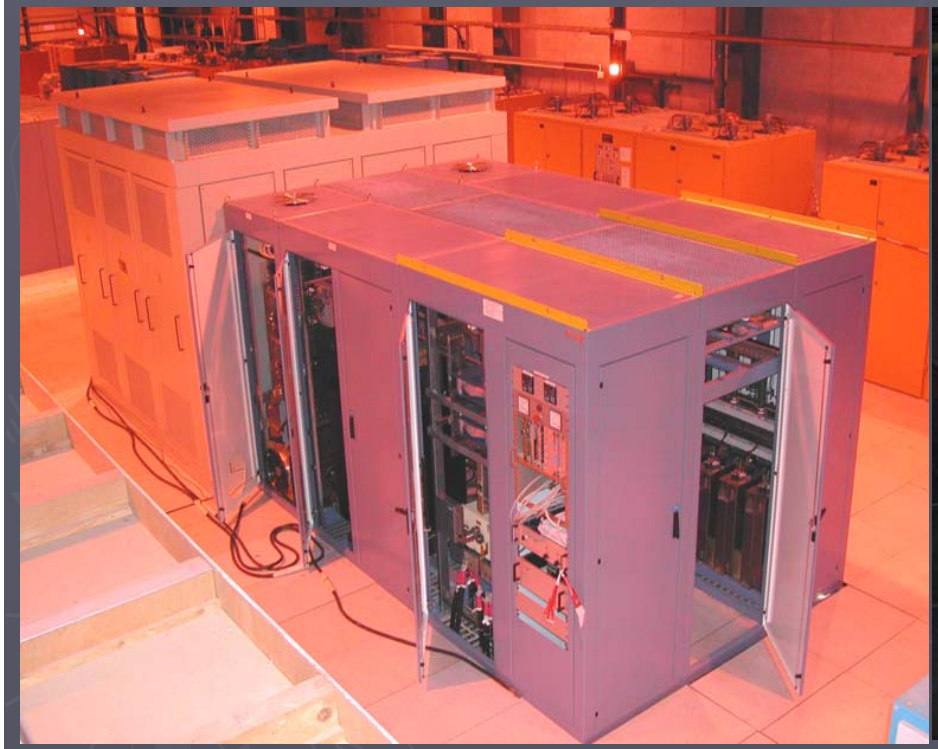
- Dewar at surface
- Supply and exhaust via 60 m long piping
- Reuse of existing equipment
- Details in RAL contribution



Access route for LN2 delivery

Power supply
for solenoid

1. Type Alice/LHCb



New - Used by LHC exp.

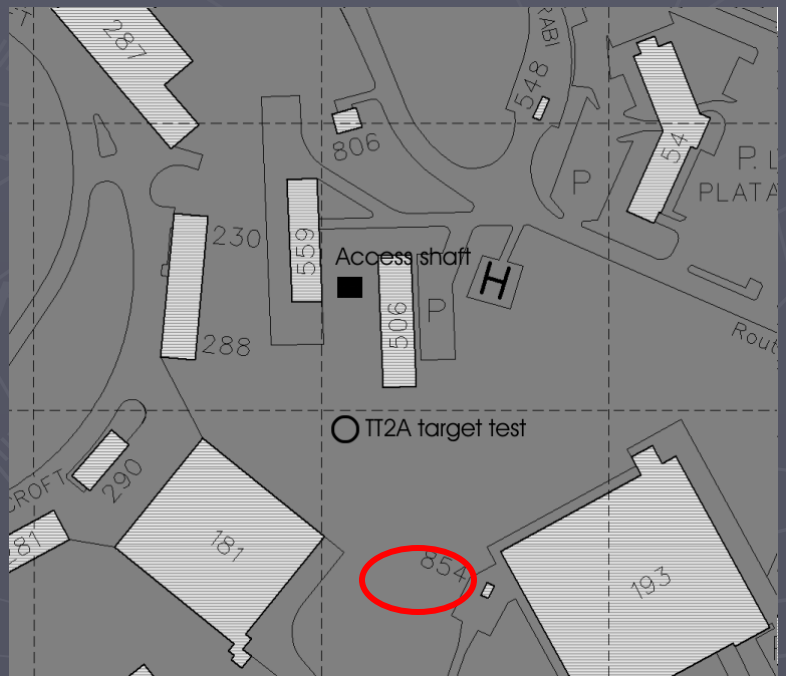
2. West Area power supply

From dismantling West Area - Refurbishment needed

Power supply
for solenoid

	Alice/LHCb	WA PS	required
Voltage [V]	< 900	< 1000	740
Current [A]	< 7200	< 8000	7200
costs	~300 kChF	~ 100 kChF	~ 0 kChF

- Further use in US or Japan considered



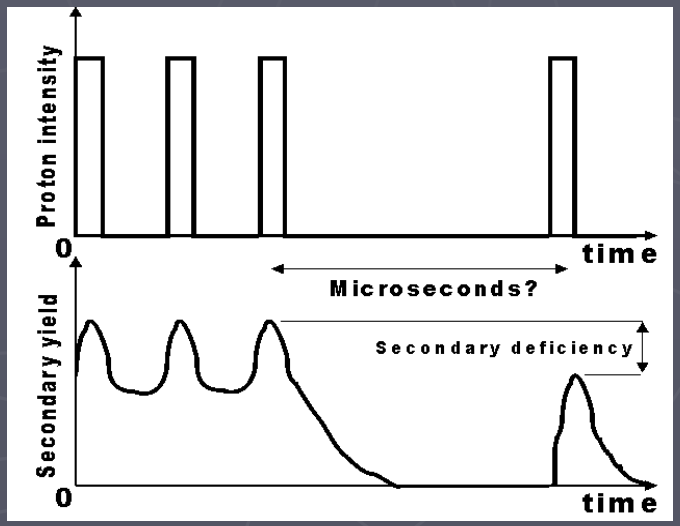
Power net:

- 18 kV cells in building 193
- Cable installation ~70 kChF
- Currently investigating impact on power net (spikes)

PS beam

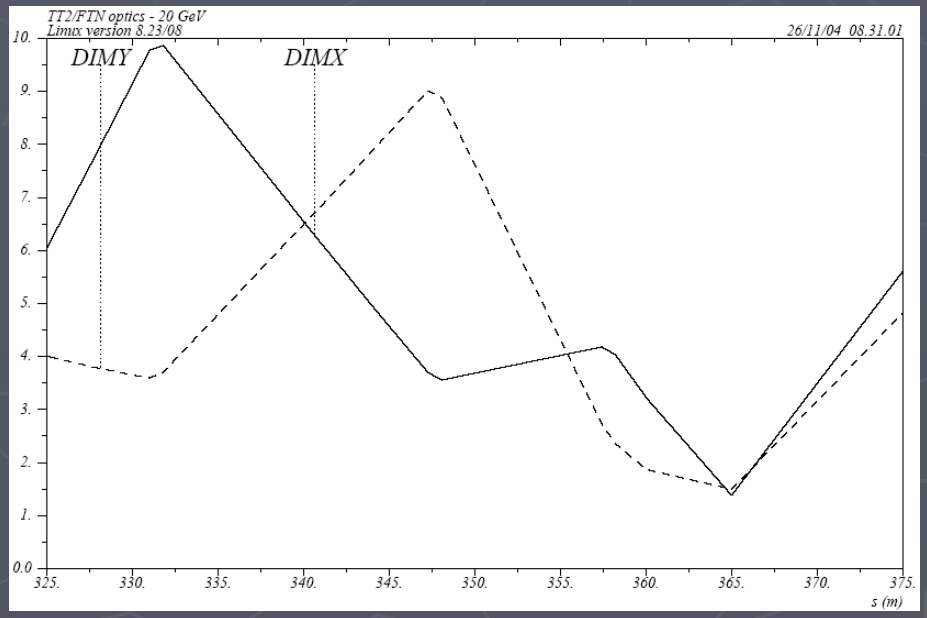
- Momentum: < 24 GeV/c
- 8 buckets to fill (h=8)
  - T = 2 μs
  - spacing: 250 ns
- 4 bunches (within one sub-cycle)
  - l = 13 ns r.m.s.
  - to our discretion in the 8 buckets
  - Multi-bunch single turn extraction
- Pulse length: 0.25 - 2 μs
- Intensity:
  - < $0.7*10^{13}$ protons/bunch
  - Total < $3*10^{13}$ p.o.t./extraction

Pump-probe method



Beam at experiment

- Beam horizontal
  - According to geometer: Δh=5mm over 100m
  - Beam height: 121 cm above ground
- Floor horizontal
- Spot:
  - r < 2 mm



Safety

- Radiation
- Mechanical safety
- Mercury
- LN2 cooling
- High magnetic field
- …
- “Waste” management

Procedure established:

- Define requirements/specs
- Prepare layout/design
- Safety review

SAFETY CONTACT PERSON FOR ALL MATTERS: Herve Buret Tel.: 160013 (replacement since Oct.2004, former Bruno PICHLER tel: 16 0889 or 73362	
	Responsible
DSO of AB	Paolo CENNINI
General Safety	Bruno PICHLER
Radiation	Thomas OTTO
Gas and Chemicals	Jonathan GULLEY
Electricity	Fritz SZONCSO
Emergency stops	
Magnetic Field	
Laser	
Fire	Fabio CORSANEGO (material also J.Gulley)
Material	
Mechanical safety	Alberto DESIRELLI
-- --- --- --- ---	also Maurizio BONA
Cryogenics	Gunnar LINDELL

---------- Memos available ----------

Radio-Protection

- Activation
  - Beam line
  - Mercury
- High intensity proton beam towards nToF target
  - beam attenuator
- Access
  - protected by
    - Two beam stoppers
    - Upgraded shielding during shutdown 2003/2004
    - Radiation monitor in TT2A

Safety

Mercury loop

- Construction at ORNL
- 6 to 8 Liter mercury
- Experience
  - at ORNL and CERN
- Double containment
- ISO 2919 “sealed sources”

Radiation

- ALARA
- Minimum number of integrated protons
  < 3 10^{15} (~100 pulses)
- Activation of area and mercury

Chemicals

- Minimum amount of mercury
- Continuous vapor monitoring
  - Inside secondary containment
- Define procedures/operation

Safety

Mechanical safety

- According to CODAP2000/ASME
- Double containment
- Pressure vessel

- **Beam attenuator**
  - to protect nToF target
- controls, **interlocks**

Cryogenics

- Standards used
- ODH study

- decommissioning
- Waste management

Decommissioning

- removal of all equipment
  - Approx. 2 weeks to restore beam line
- "Waste" management
  - Activated mercury — returned to ORNL
  - Solenoid — shipped to Japan
    considered for further use
  - Power supply — goes with solenoid
  - Mercury loop — reused in Japan/US?
  - …

Summary

- Integration of experiment technically possible!
  - No safety obstacles
- DG approval needed ...