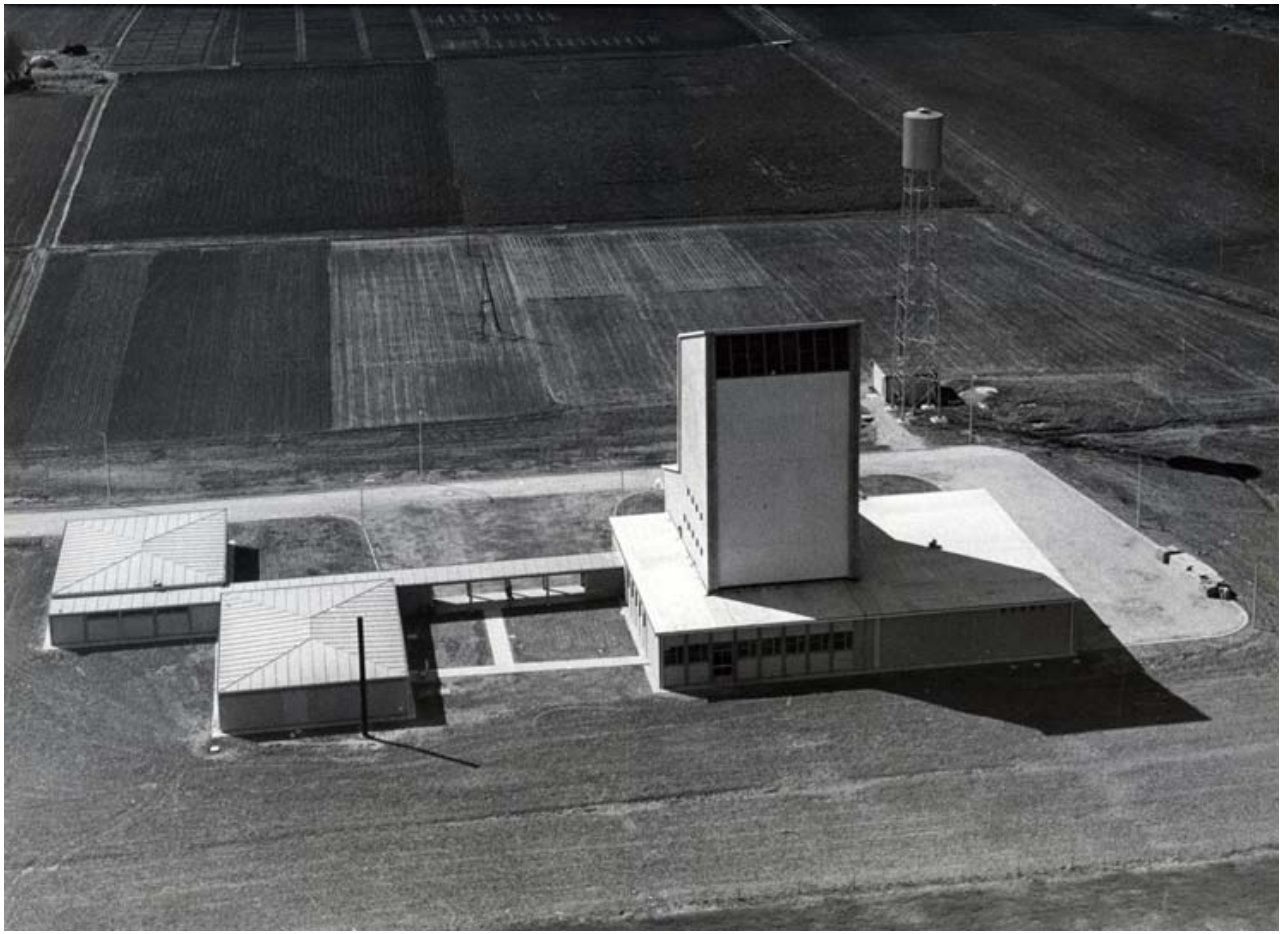
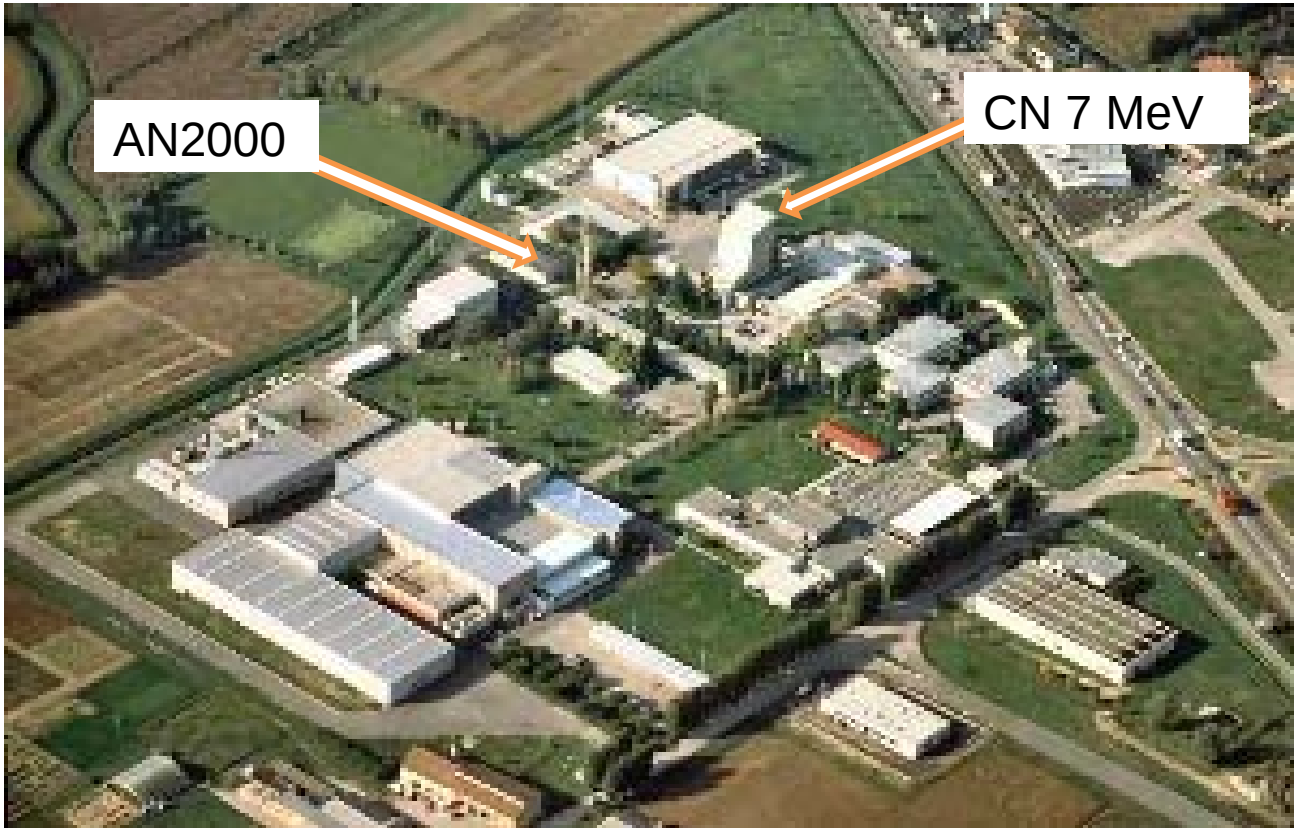
LNL Low Energy Accelerators

A. Lombardi

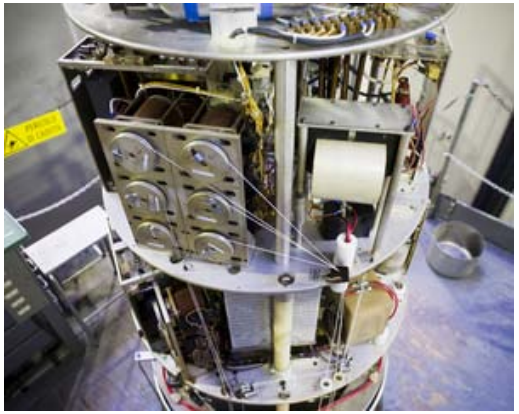
On behalf of the SMAIA Group

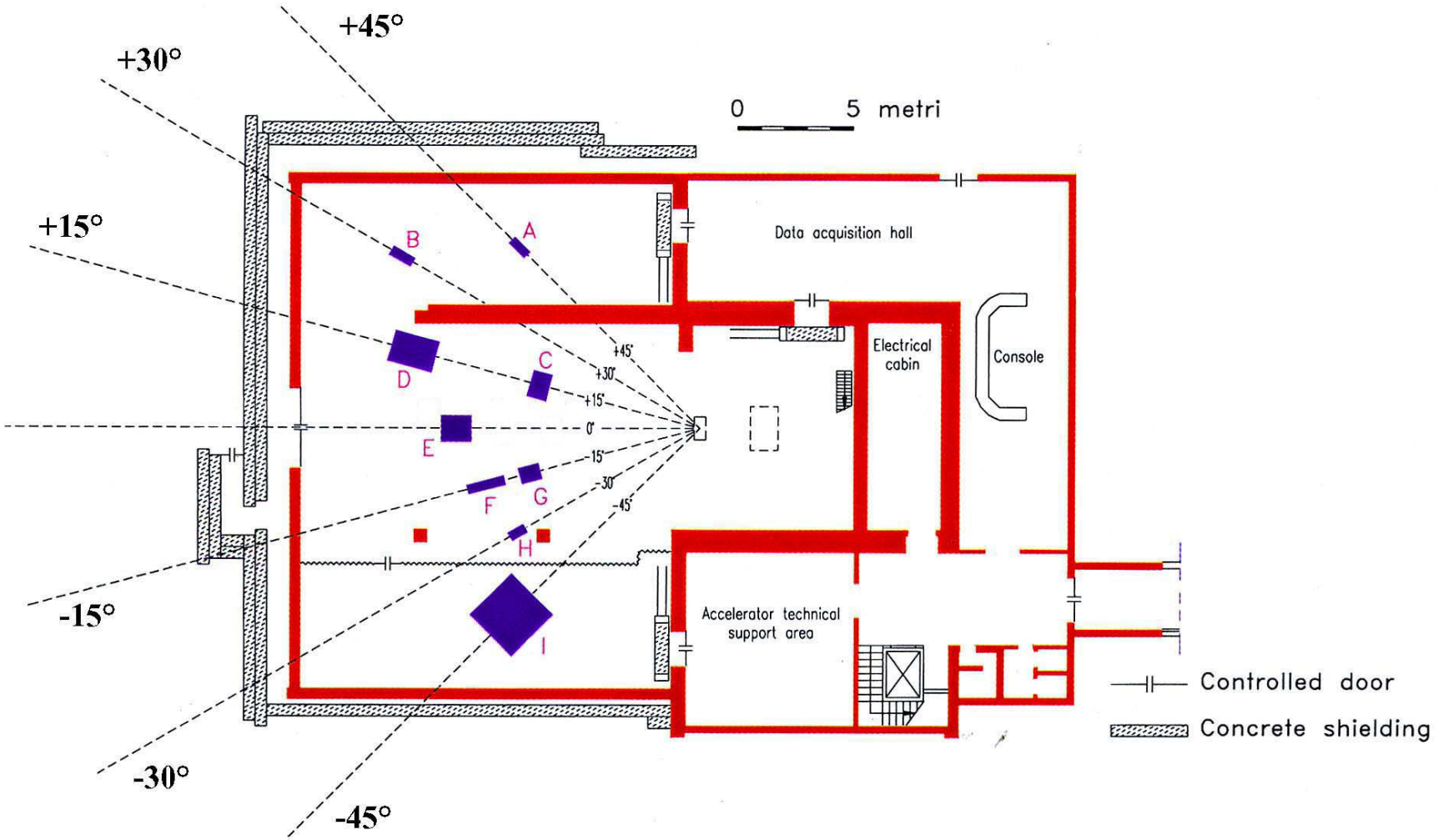


Legnaro Laboratories Early 60ties



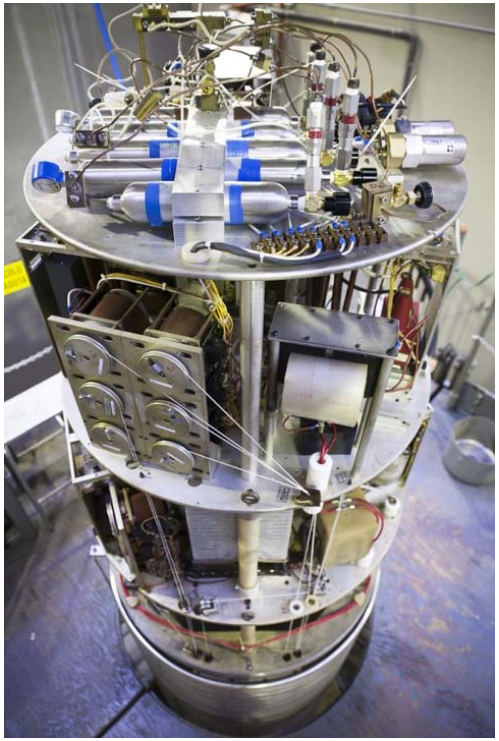
Legnaro Laboratories today



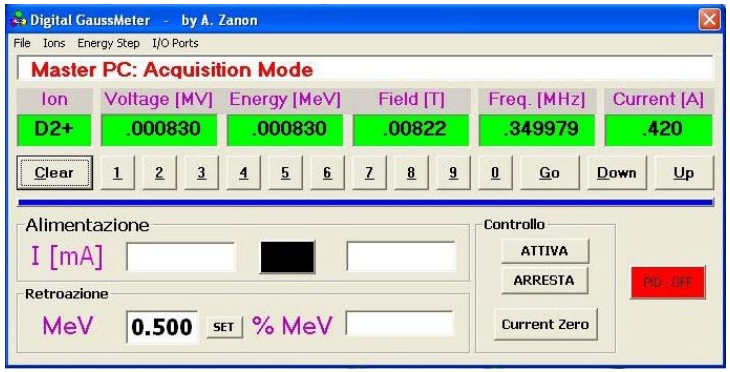

+45°
+30°
+15°
-15°
-30°
-45°
0 5 metri
A
B
C
D
E
F
G
H
I
+45°
+30°
+15°
0°
-15°
-30°
-45°
Data acquisition hall
Electrical cabin
Console
Accelerator technical support area
Controlled door
Concrete shielding

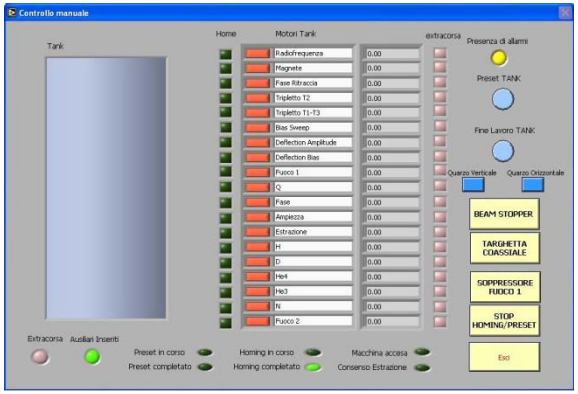
CN 7MeV accelerator

- RF source
- Ion species: $^{1,2}H$, ^{3}He , ^{4}He, D, ^{15}N
- Single and double charge
- Maximum Terminal Voltage ≈ 6MV
- Maximum current ≈ μA
- Pulsed beam 3MHz
- Triplet focusing system
- Belt charging system




SPELLMAN


Digital GaussMeter - by A. Zanon
File Ions Energy Step I/O Ports
Master PC: Acquisition Mode
Ion
Voltage [MV]
Energy [MeV]
Field [T]
Freq. [MHz]
Current [A]
D2+
.000830
.000830
.00822
.349979
.420
Clear
1 2 3 4 5 6 7 8 9 0
Go
Down
Up
Alimentazione
I [mA]
Controllo
ATTIVA
ARRESTA
PID : OFF
Retroazione
MeV
0.500
SET
% MeV
Current Zero


Controllo manuale
Tank
Home
Motori Tank
extracorsa
Presenza di allarmi
Preset TANK
Fine Lavoro TANK
Quarzo Verticale
Quarzo Orizzontale
BEAM STOPPER
TARGHETTA COASSIALE
SOPPRESSORE FUOCO 1
STOP HOMING/PRESET
Esci
Extracorsa
Ausiliari Inseriti
Preset in corso
Preset completato
Homing in corso
Homing completato
Macchina accesa
Consenso Estrazione

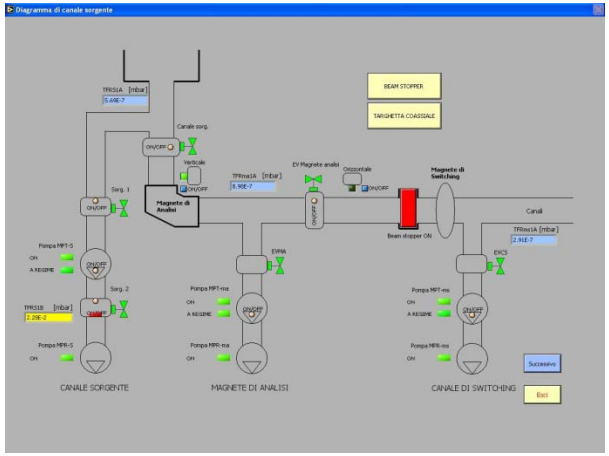


Diagramma di canale sorgente
BEAM STOPPER
TARGHETTA COASSIALE
Canale sorg.
Verticale
Orizzontale
Magnete di Analisi
Beam stopper ON
Canale
Successivo
Esci
CANALE SORGENTE
MAGNETE DI ANALISI
CANALE DI SWITCHING

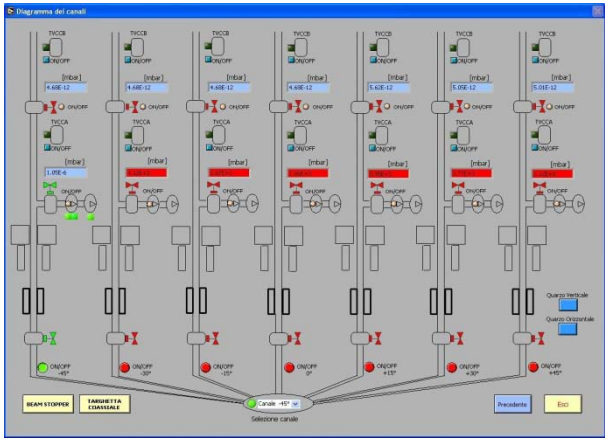
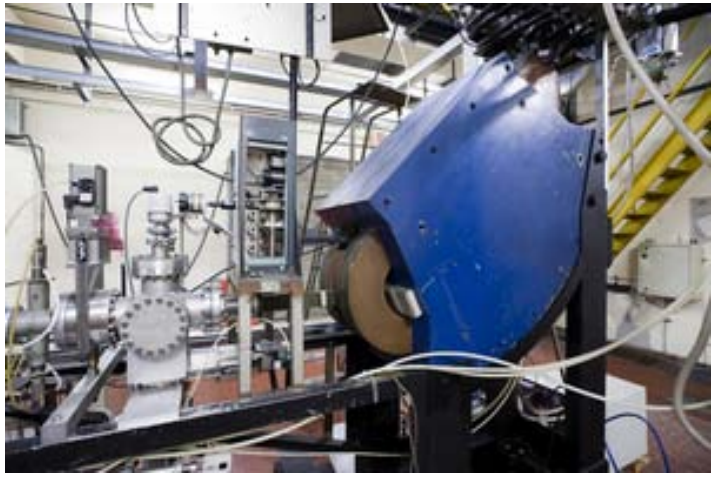


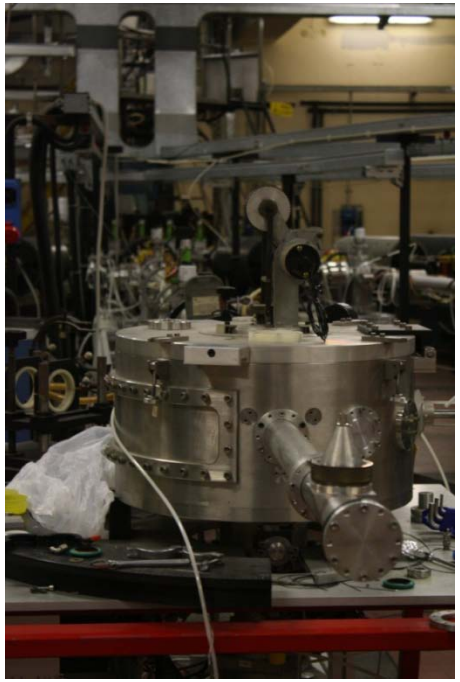
Diagramma dei canali
Quarzo Verticale
Quarzo Orizzontale
BEAM STOPPER
TARGHETTA COASSIALE
Precedente
Esci
Selezione canale

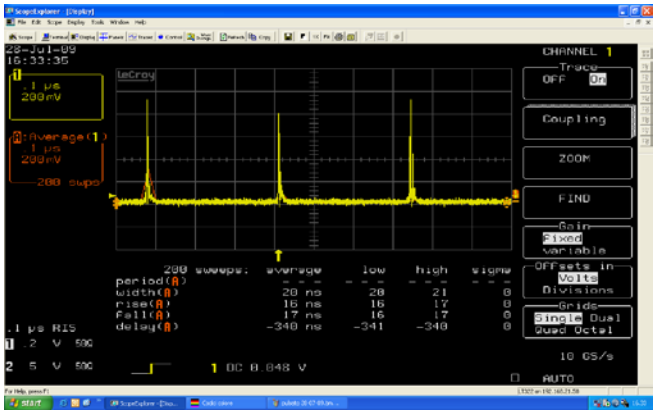


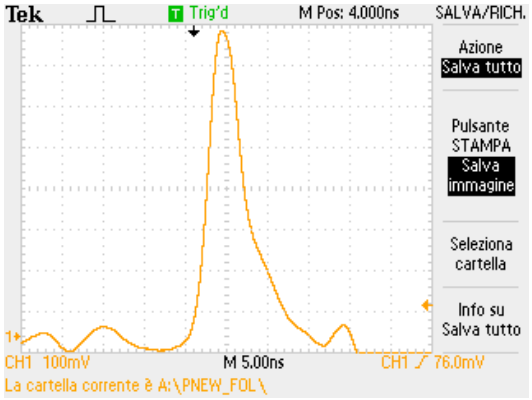

ALLUMINIO

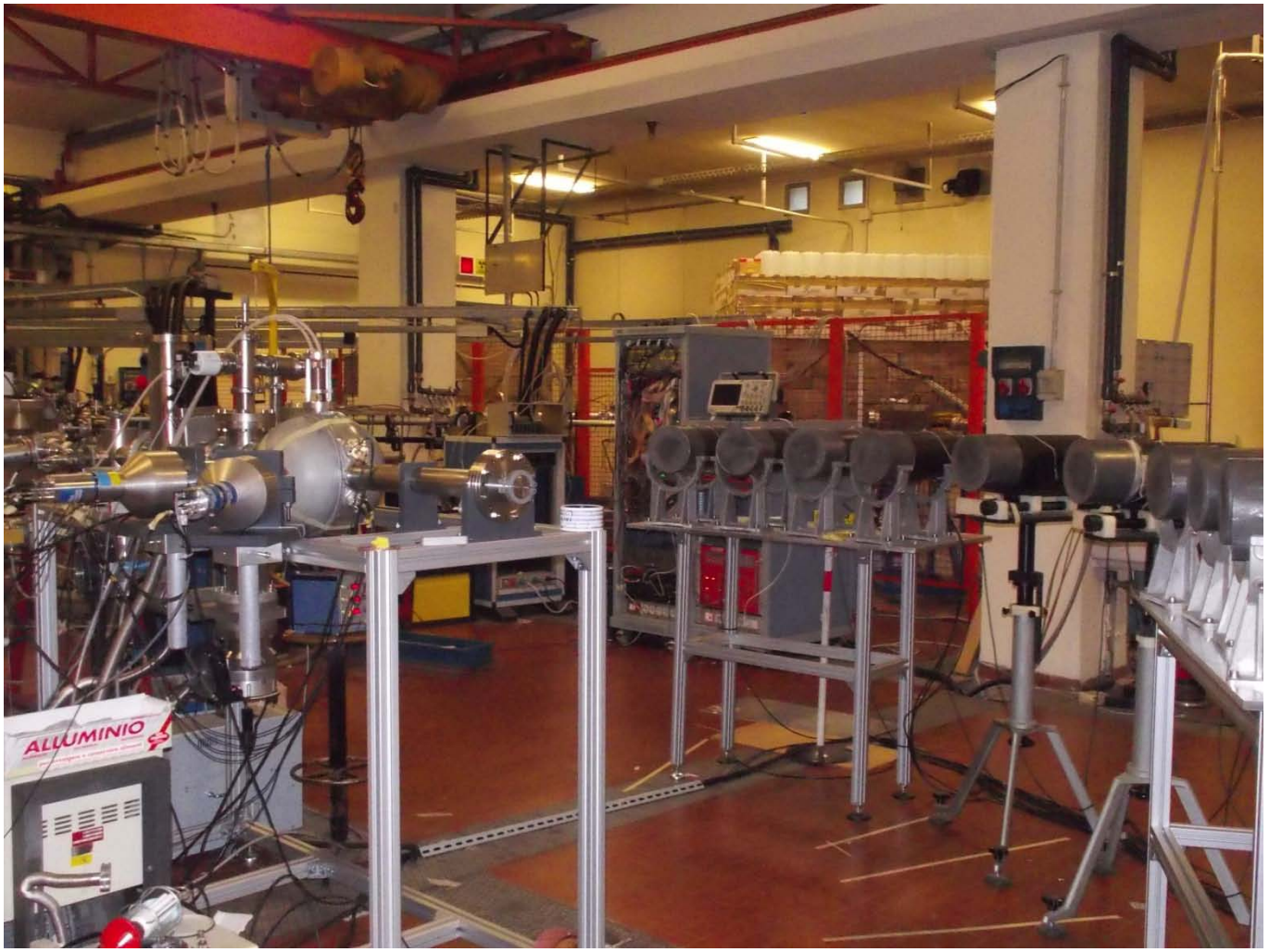
Pulsed beam:

- 3-1 MHz rf pulsing system on the high voltage terminal
- Only 3 MHz operating
- 2 pick-ups on the 0º beam line for Time-of-flight measurements
- Fast faraday cup for the beam preparation
- Future installation of chopping system to decrease the frequency (less than 1 MHz)



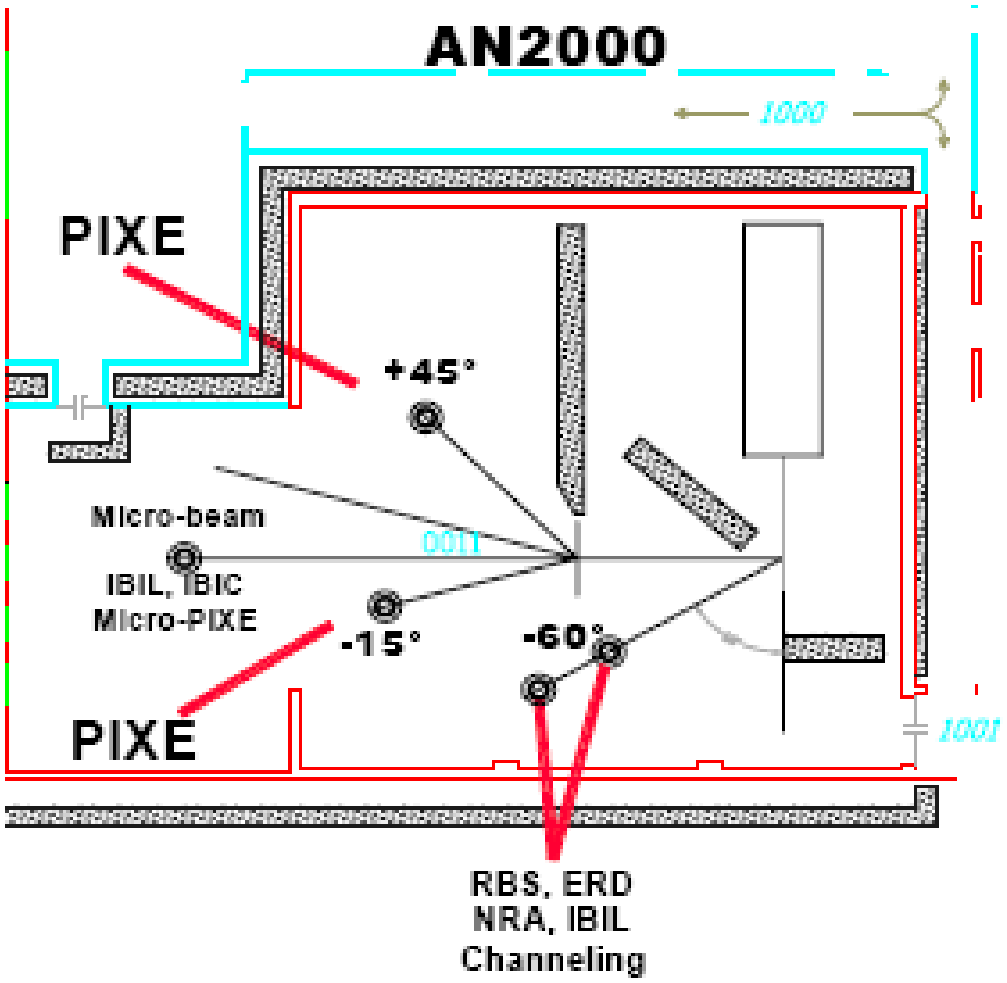





ALLUMINIO

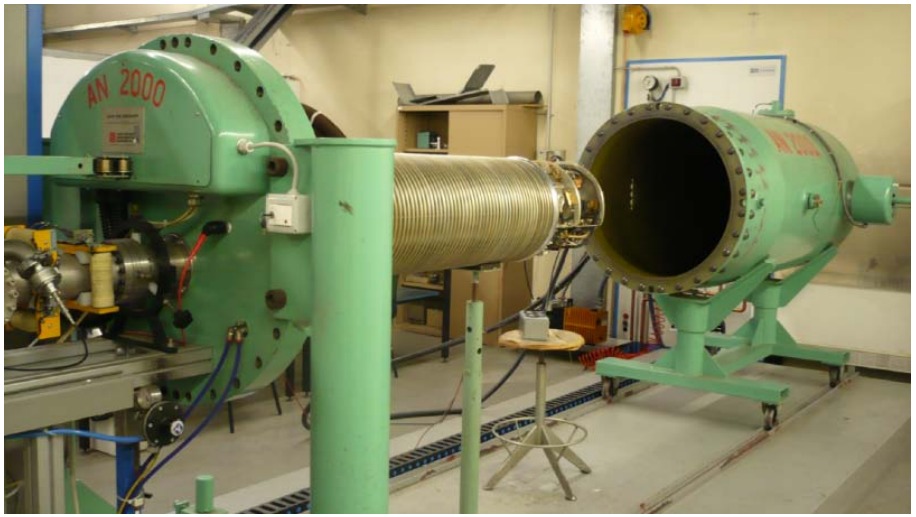

AN2000
CN 7 MeV


AN 2000


AN2000
1000
PIXE
+45°
Micro-beam
0011
IBIL, IBIC
Micro-PIXE
-15°
-60°
PIXE
1001
RBS, ERD
NRA, IBIL
Channeling

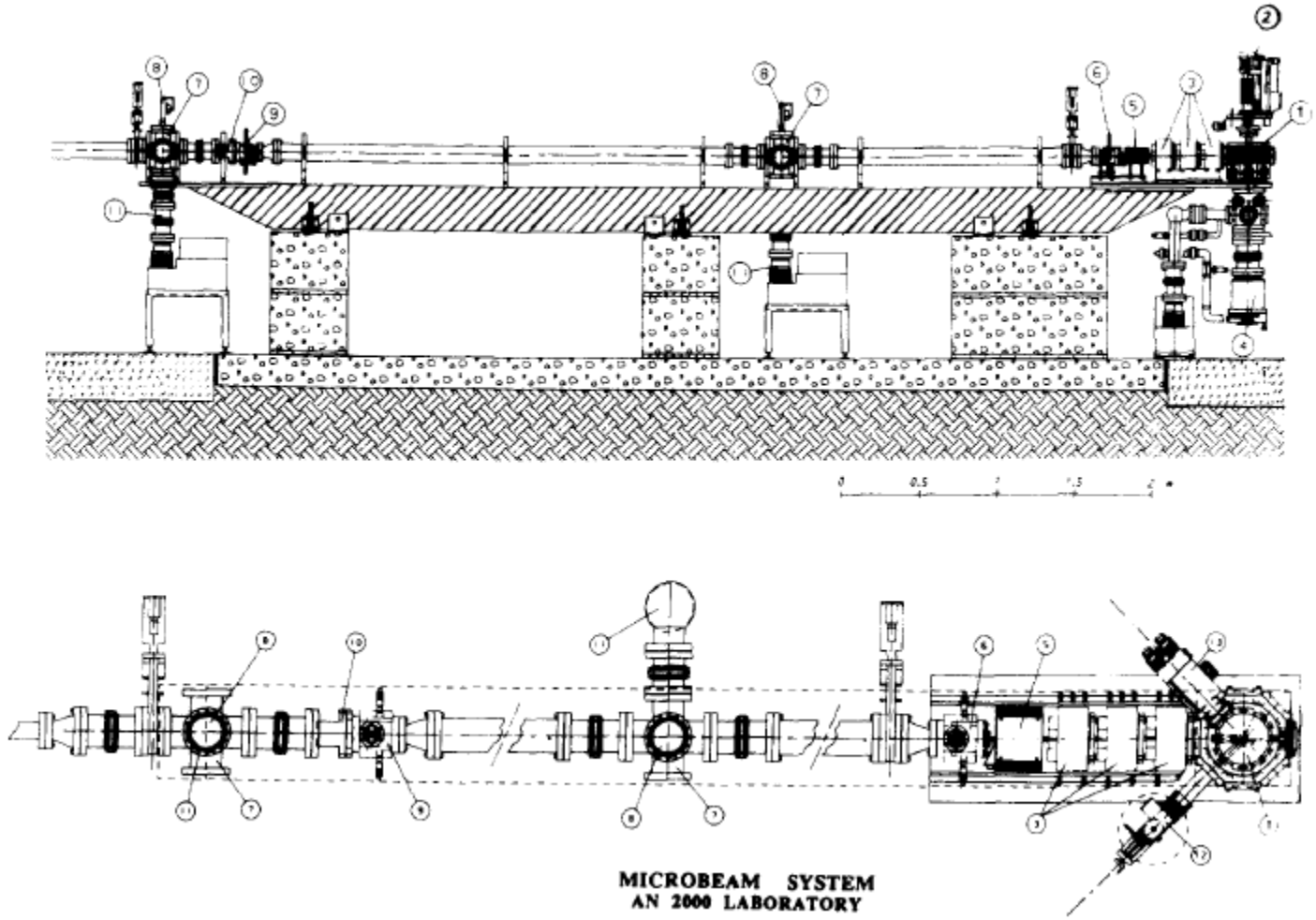
AN 2000 accelerator

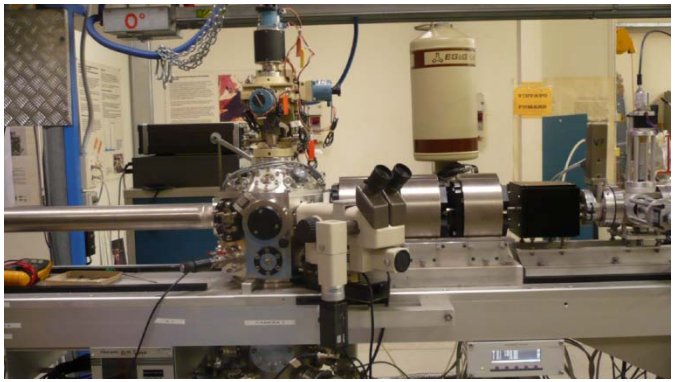
- RF source
- Horizontal machine
- Belt charge
- Maximum terminal voltage ≈ 2.5 MV
- Beam species : H, He single charge
- 5 beam lines
- 1 μ Beam transport line

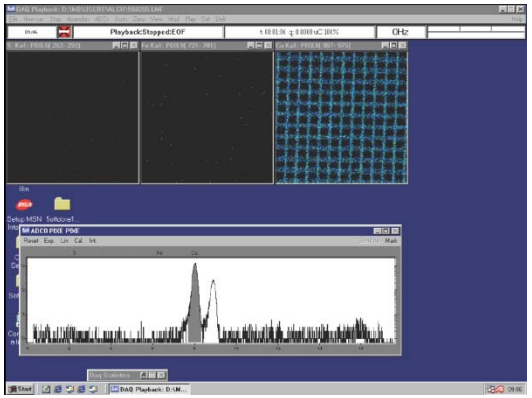


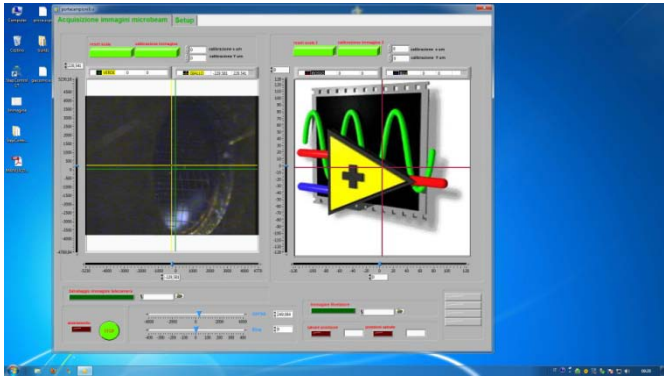
Accelerator control console

User control console


MICROBEAM SYSTEM
AN 2000 LABORATORY







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