Nuclear research in Debrecen

EWON/dLSF meeting

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ATOMKI

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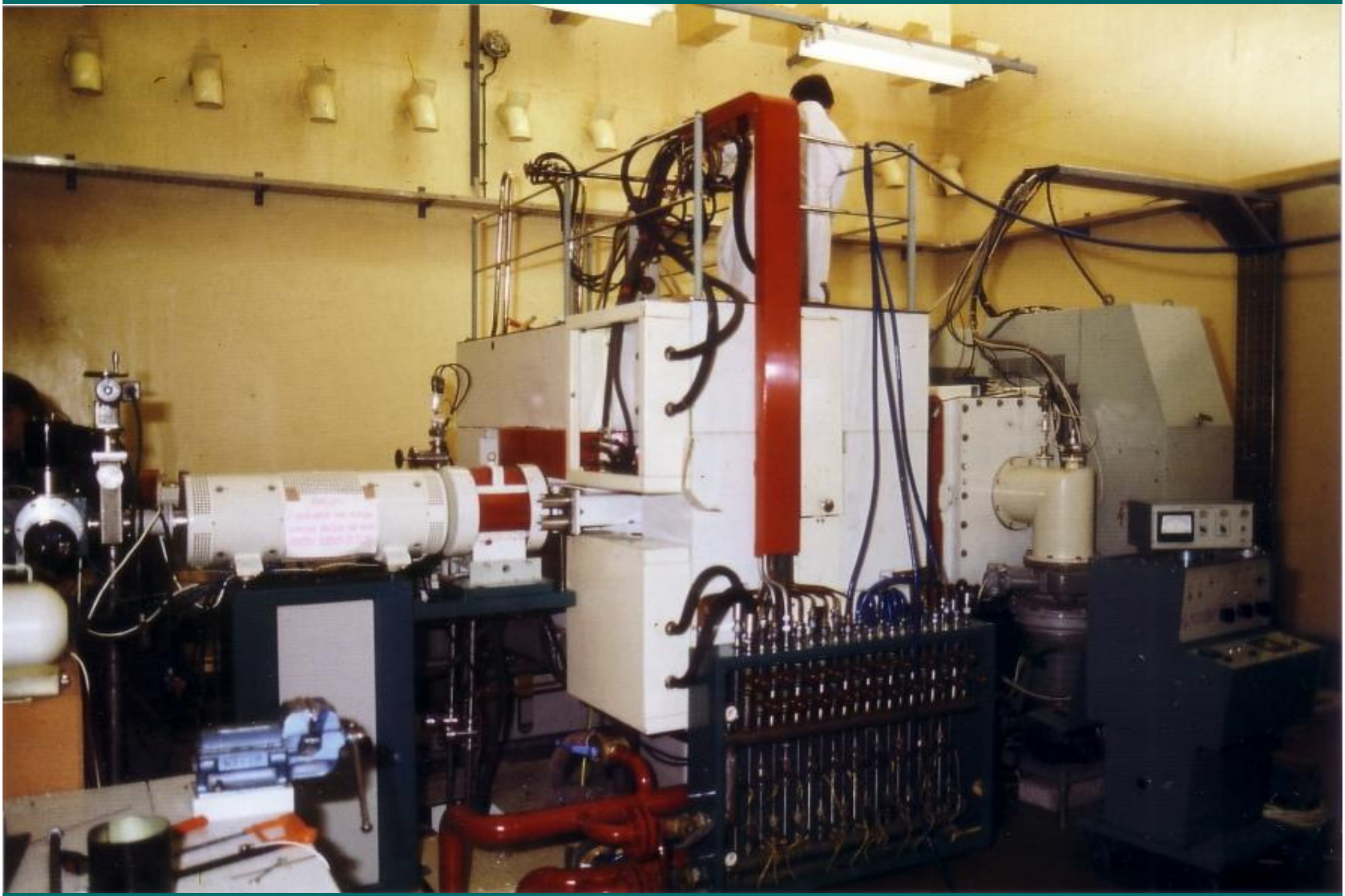
ATOMMAG KUTATÓ INTÉZETE

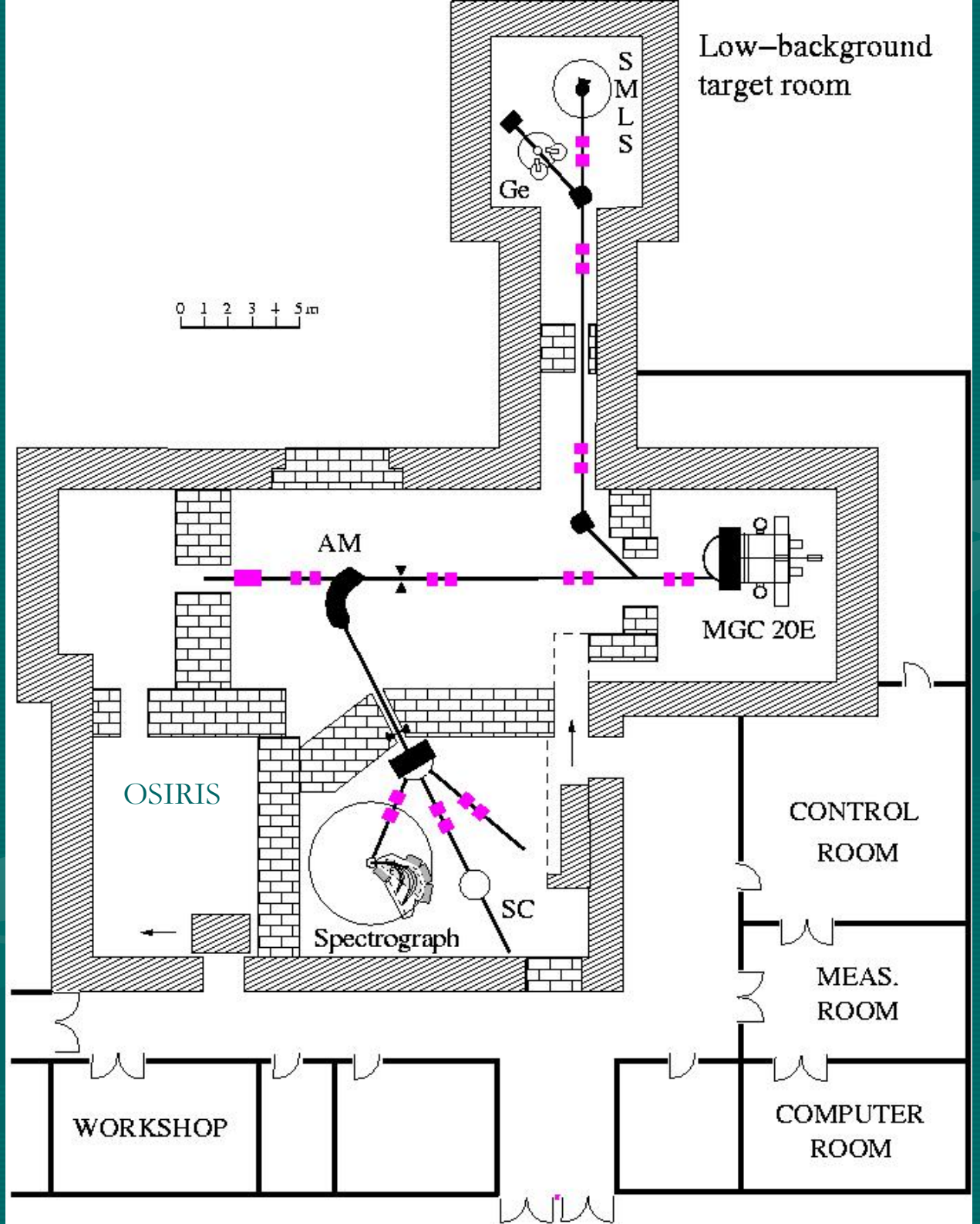
People

- 190 employee
- 90 scientist
- 22 nuclear physicist (15 exp. 7 theory)
- 2 PhD
- 1 postdoc
- **The total amount of funding** (including salaries): ≈5 M€/year

Accelerators

- **Isocronous cyclotron.** (K=20) for light ions, p, d, 3He, α and intensities of maximum 50 μA. Energies from 3 MeV (p) to 27 MeV for 3He paricles
- **5MV Van de Graaff accelerator.** Ions: H^+, $2H^+$, D^+, $4He^+$, C^+, N^+, O^+, Ne^+ Max. current: 1-20 μA (depending on ion species) Energy stability: <1kV
- **1MV Van de Graaff accelerator.** Ions: H^+, $4He^+$, C^+, N^+, O^+ Max. current: 1-20 μA
- **ECR ion source** for atomic physics




Low–background
target room
S
M
L
S
Ge
0 1 2 3 4 5m
AM
MGC 20E
OSIRIS
SC
Spectrograph
CONTROL
ROOM
MEAS.
ROOM
WORKSHOP
COMPUTER
ROOM

Main Instrumentation for Nuclear Physics Experiments

- Split pole magnetic spectrograph.
- CLOVER type HPGe detector with BGO shield and other HPGe detectors.
- Superconducting Solenoid, and mini orange magnetic electron spectrometers.
- Ionization chambers and PPAC detectors for fission fragments.
- Scattering chamber with Si particle telescopes.
- Multi-detector array for high energy nuclear e+e- pair spectroscopy.

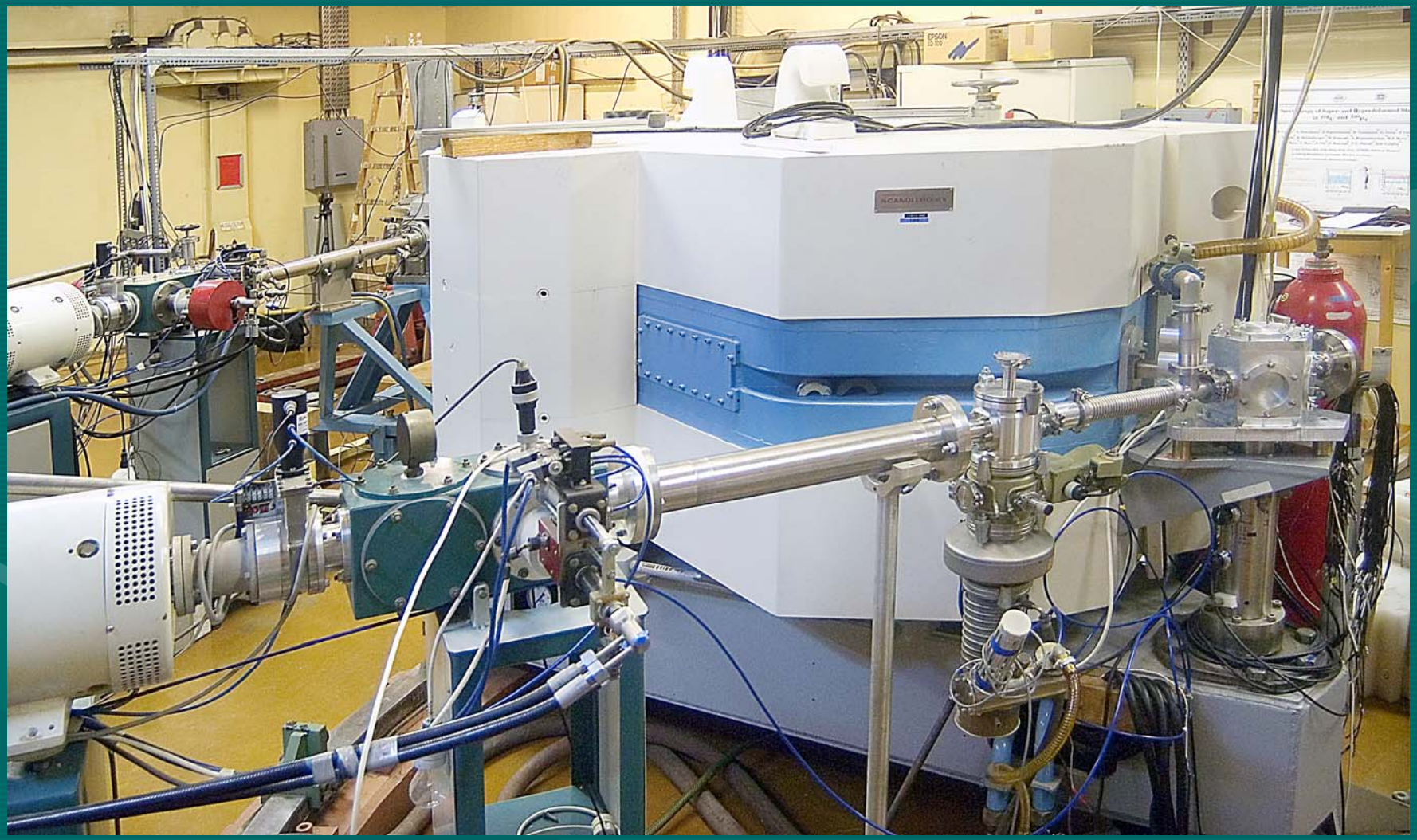
Main Fields of Nuclear Research

- Spectroscopy of super- and hyperdeformed states in the actinide region.
- Study of fission barriers and the fission process.
- Study of α-optical model potential for nuclear astrophysics
- Study of γ-decay of giant resonances

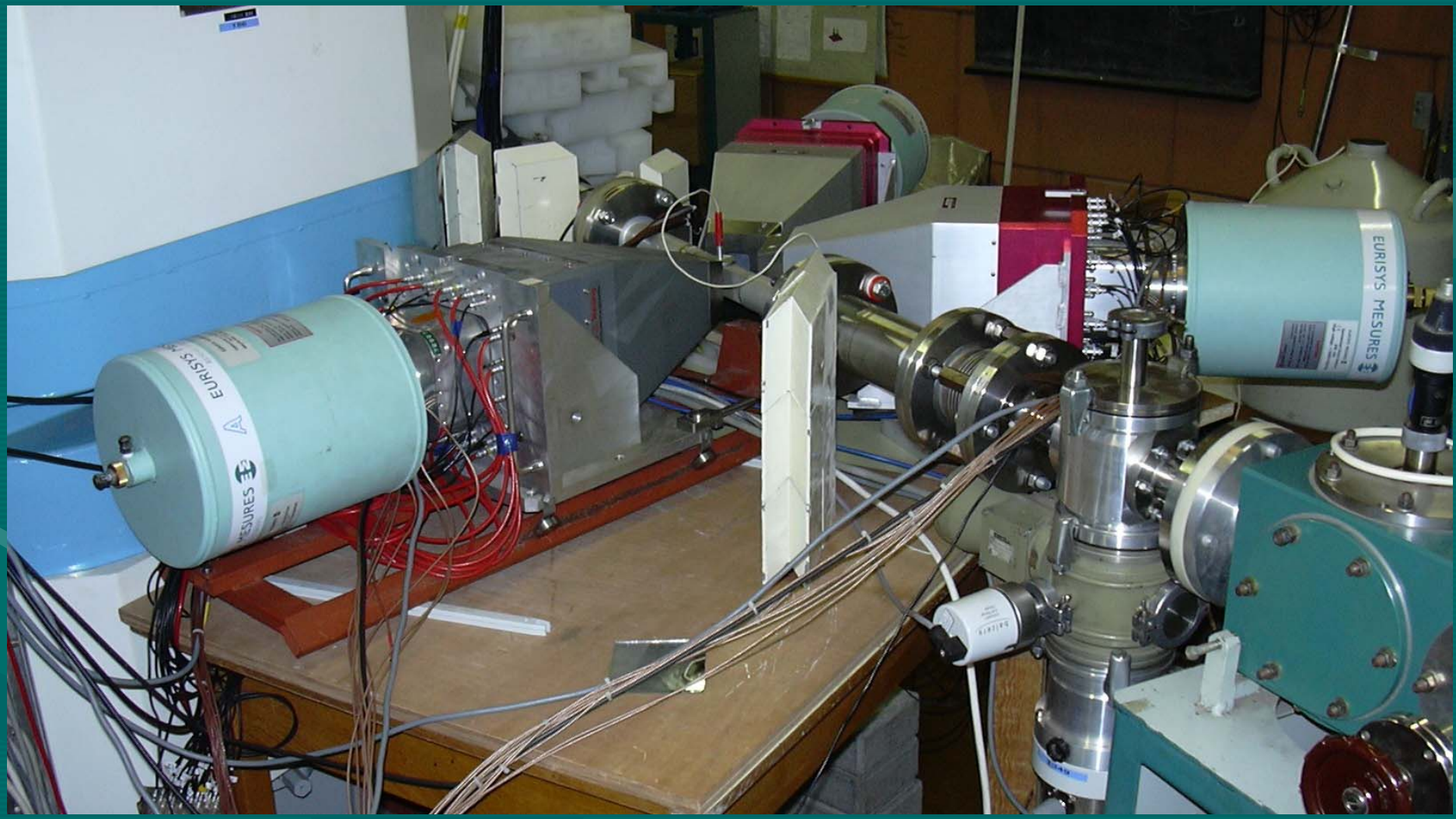
Main Fields for Other research

- Production of radioactive isotopes for a PET camera.
- Production of long lived radioactive isotopes for radioactive beams used abroad.
- Thin layer activation. Nuclear data measurements. Neutron and gamma induced mutations.
- Radiation hardness tests of electronic units.

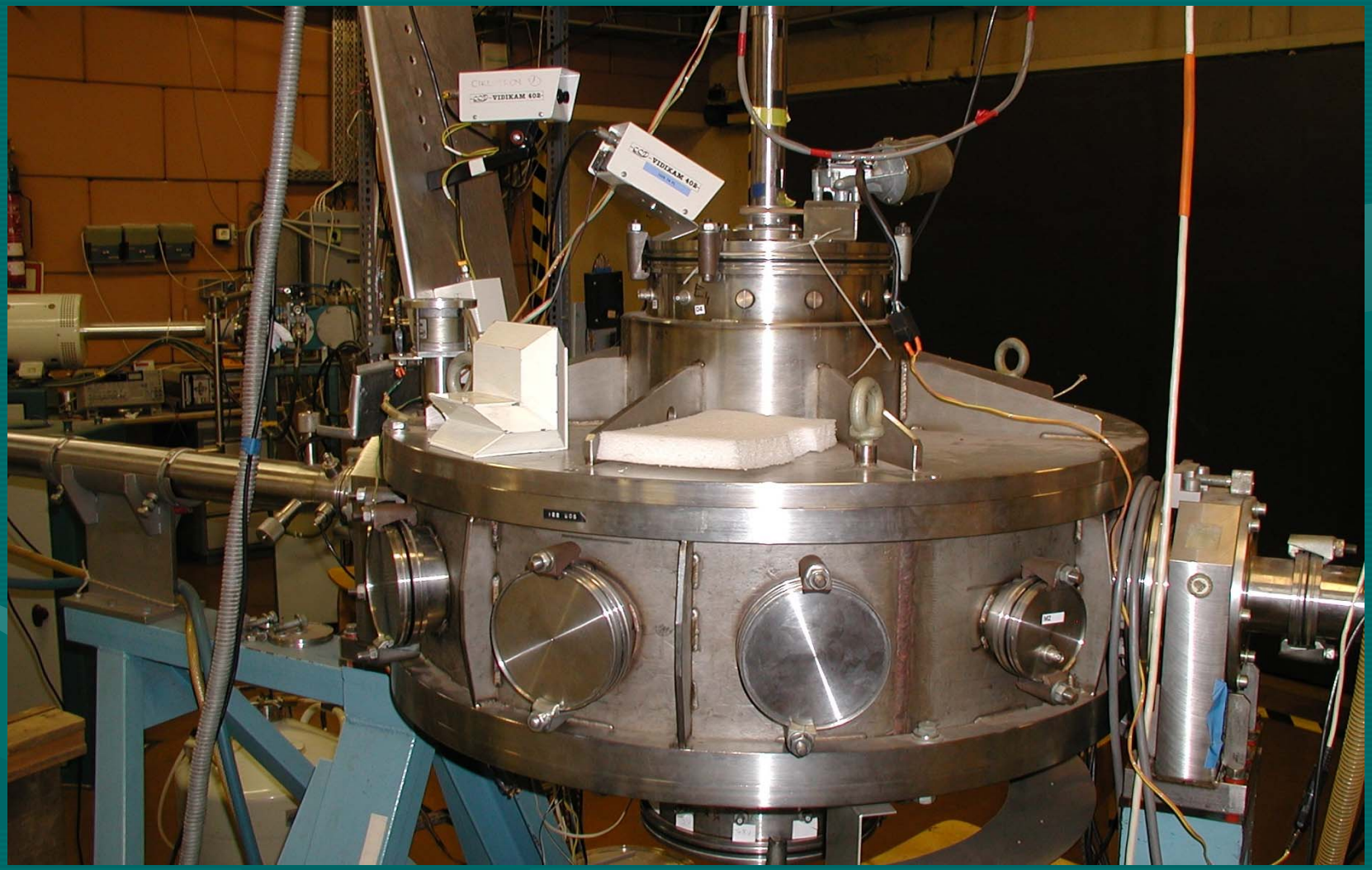
The split-pole magnetic spectrometer



Clover-type gamma spectrometers



A large scattering chamber



Main Instrumentation for Nuclear Physics Experiments (VDG5)

- Scanning Nuclear Microprobe (Oxford triplet)
- PIXE chamber (Canberra Si(Li) detector, isolated target chamber for accurate charge measurements)
- Target chamber for Nuclear Astrophysics (variable configuration, usually gamma or particle detection)
- e+ e- pair spectrometer with MWPC tracking detectors and plastic scintillator telescopes.
- e+ e- pair spectrometer with superconducting solenoid transporter and Si micro vertex detectors (under construction).
- High resolution electrostatic electron spectrometer (ESA-21) with ranges: angular (0-180deg) and energy (5eV-12keV).

Main Fields of Nuclear Research

- Ion Beam Analysis (PIXE, PIGE, DIGE, RBS) broad beam and microbeam
- Nuclear Astrophysics
- Fundamental interactions. (study of the internal pair creation process in nuclear transitions)

Main Fields of Other Research

- Proton Beam Micromachining
- Ion induced electron spectroscopy for atomic physics
- High resolution Auger spectroscopy in atomic collisions.
- Double differential electron emission cross sections in ion-atom and ion-molecule collisions
- Higher order processes in ionization of atoms by energetic ions