DETECTOR INTEGRATION

◆ What has changed ◆

■ Detector overview ■

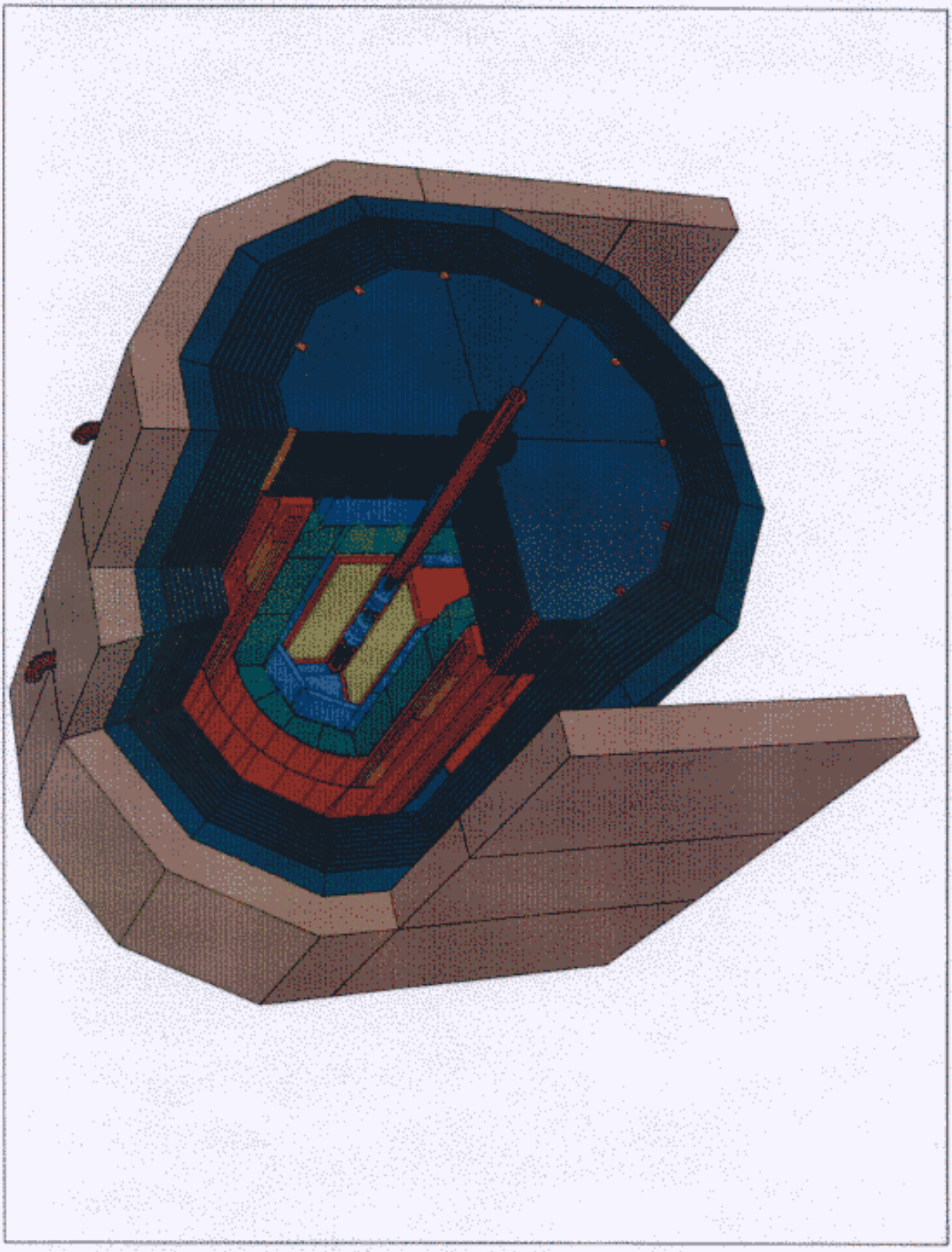
◆ Hall scenarios: Parking position, beam position ◆

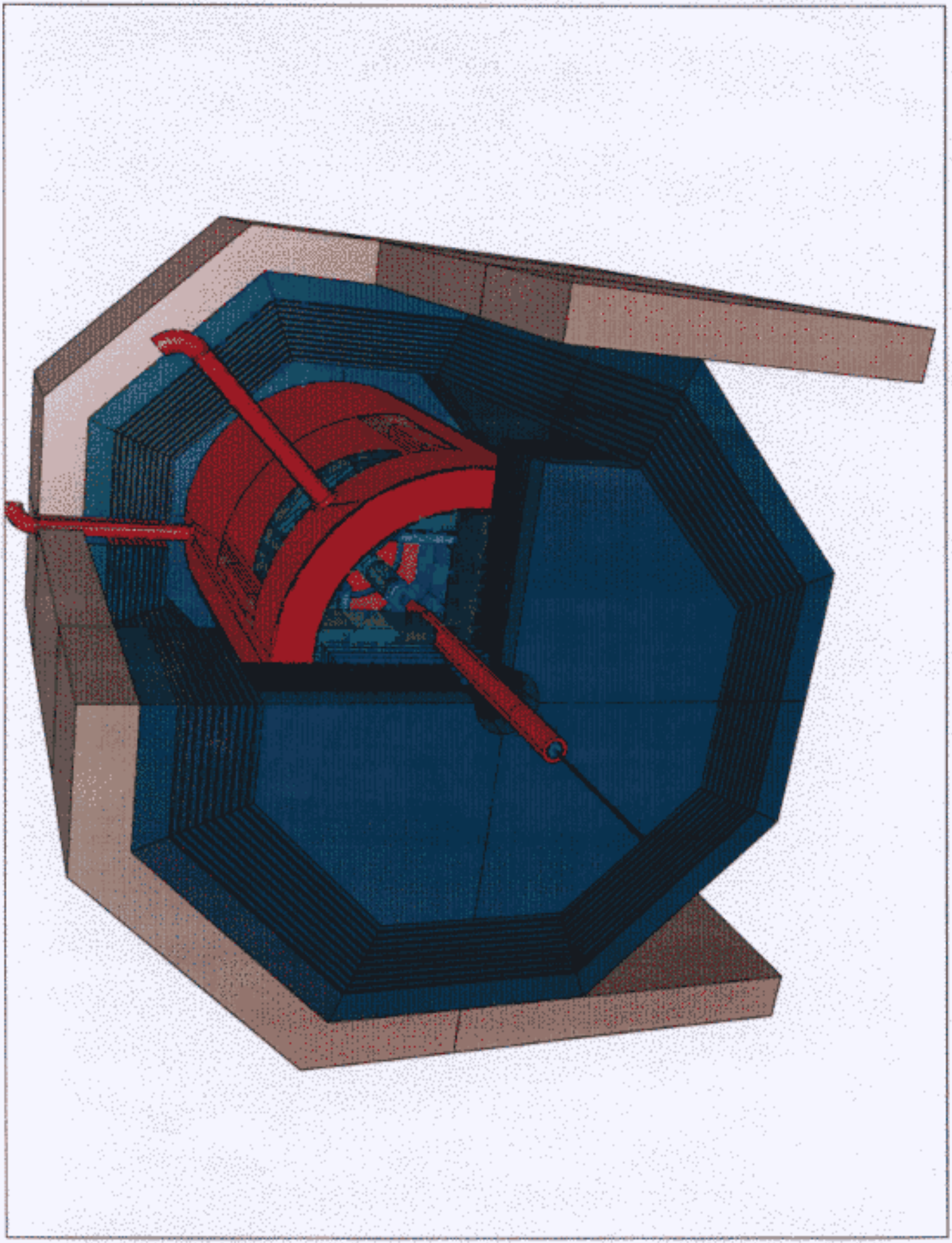
■ Access to central beam pipe region (vertex, inner tracker) ■

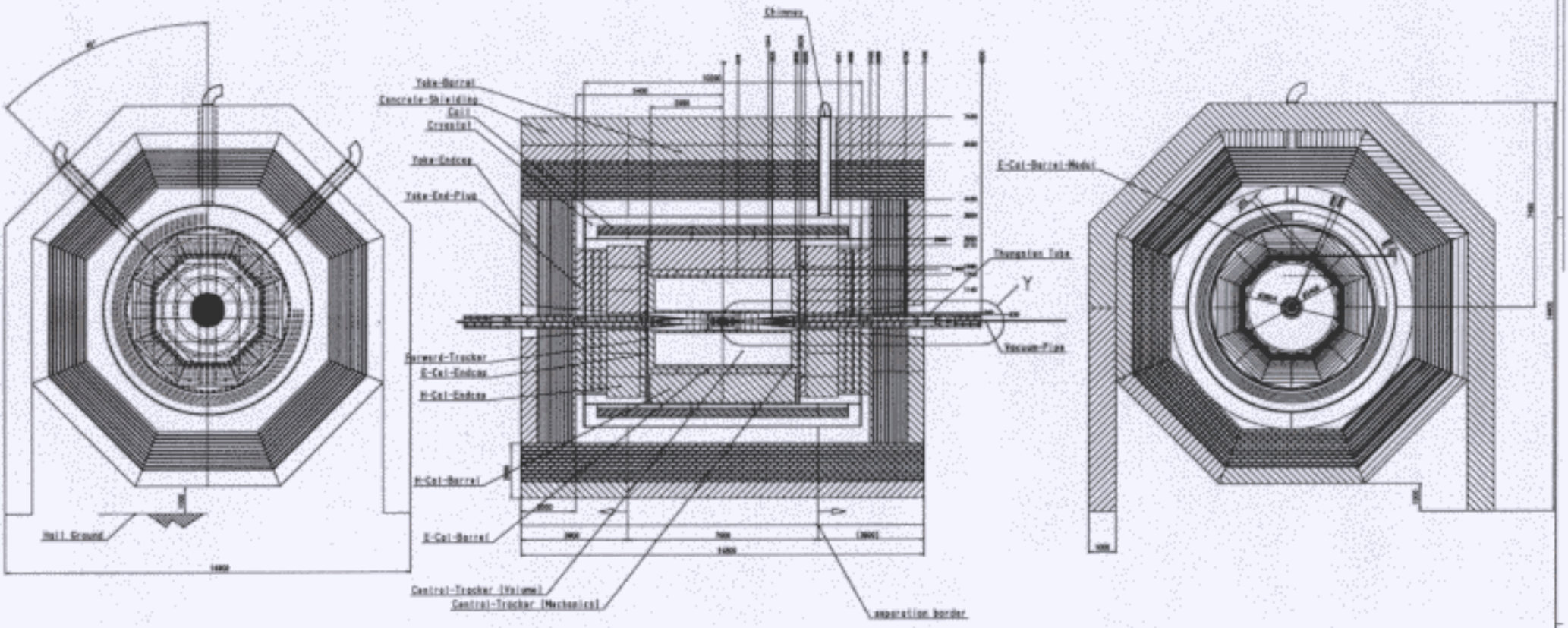
◆ Beampipe support ◆

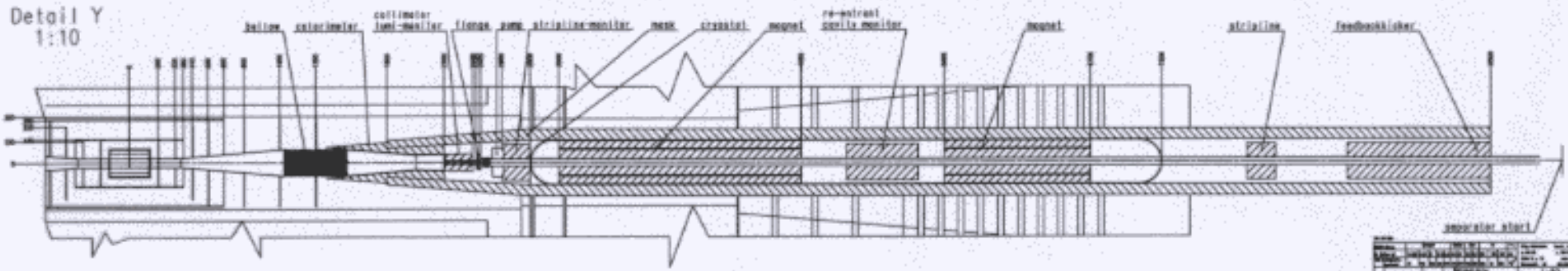
■ Second interaction point ■

■ „Ellerhoop" ■

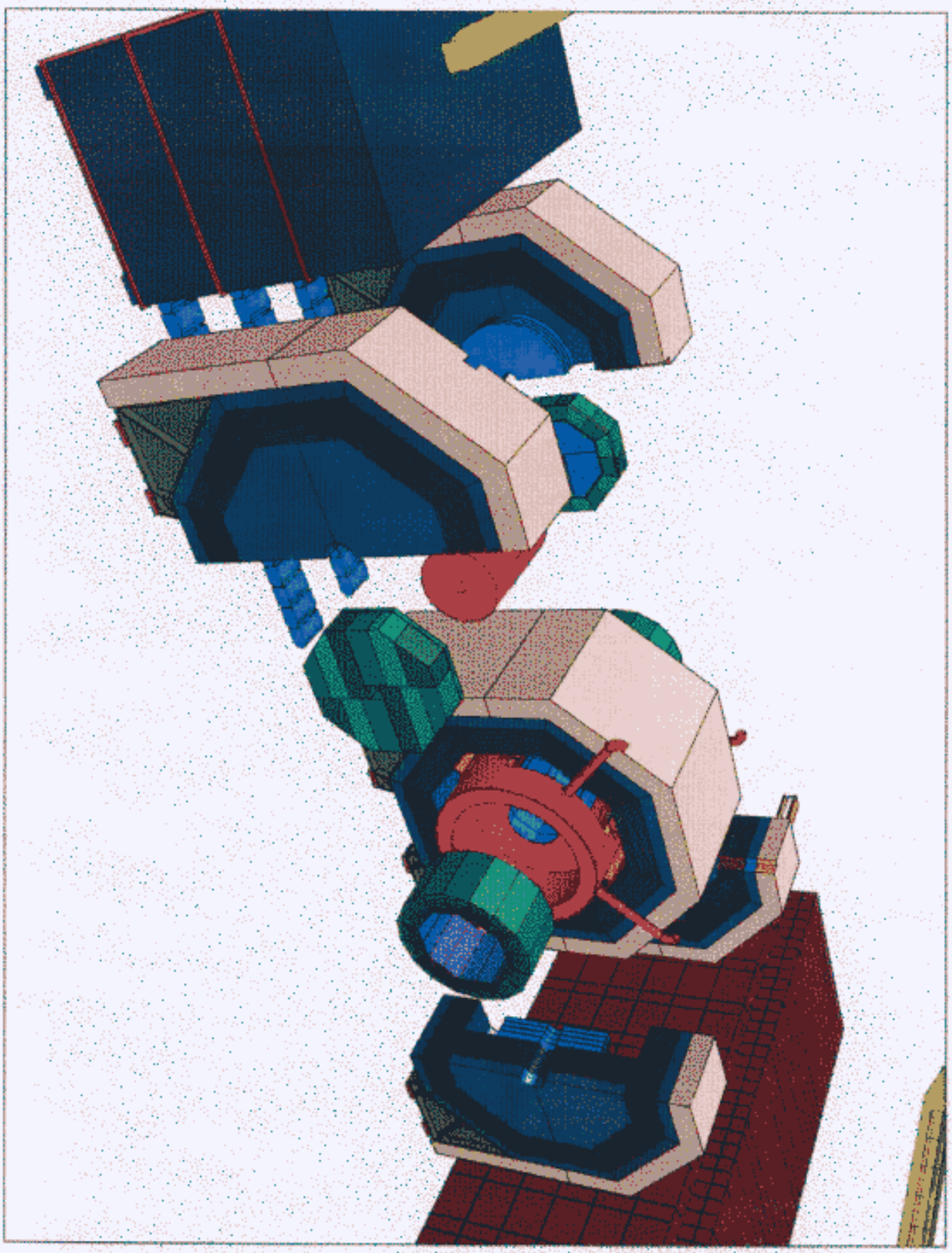


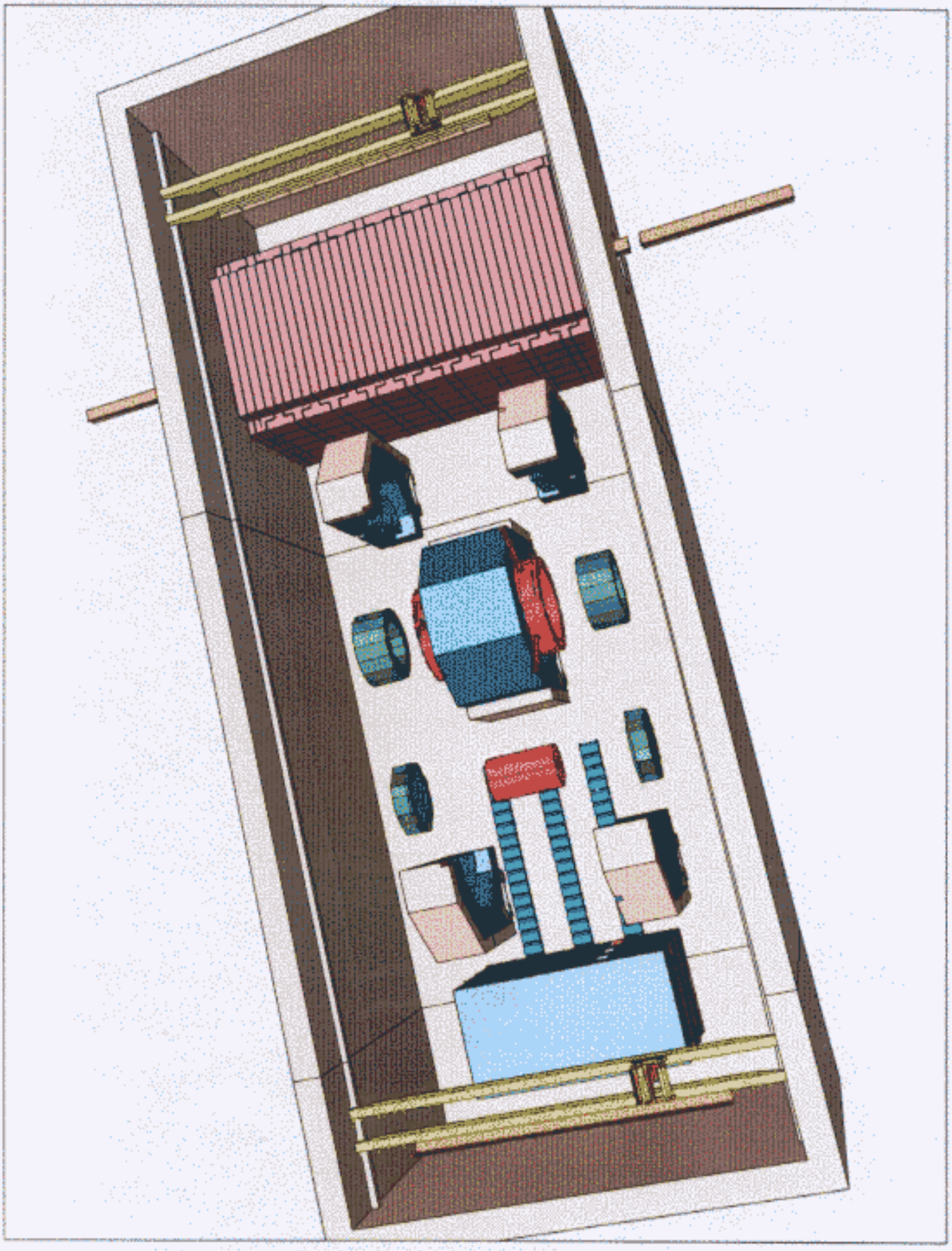


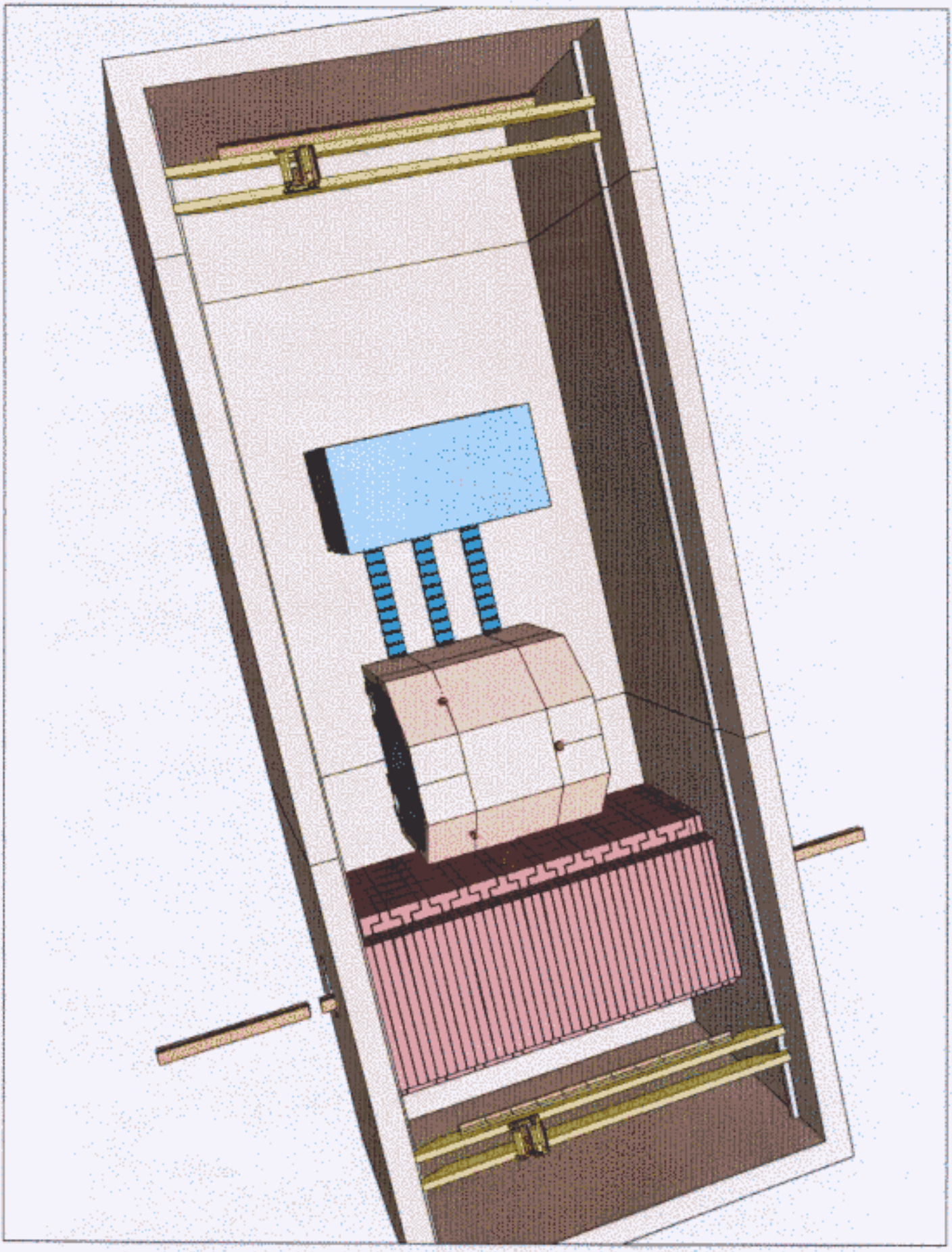


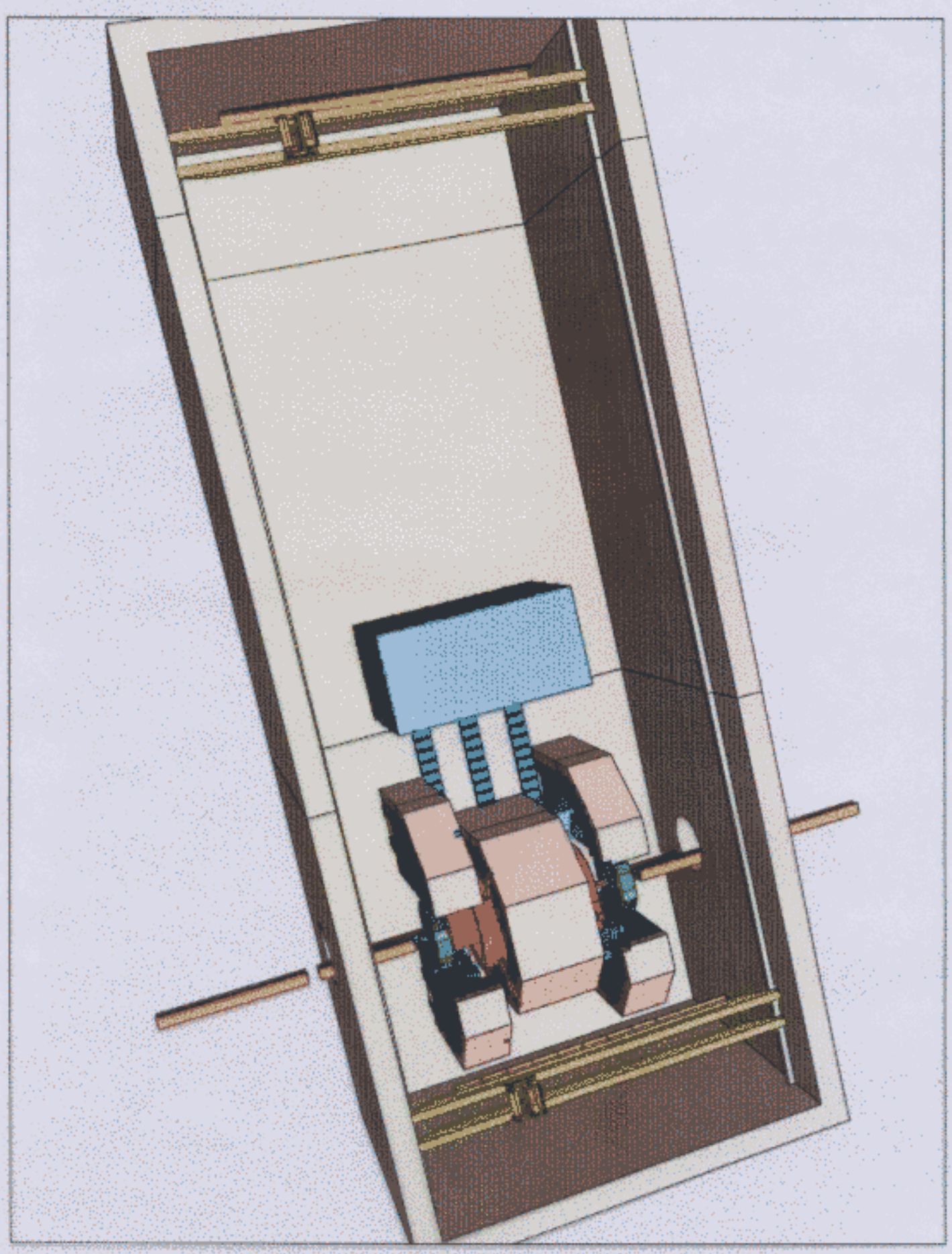


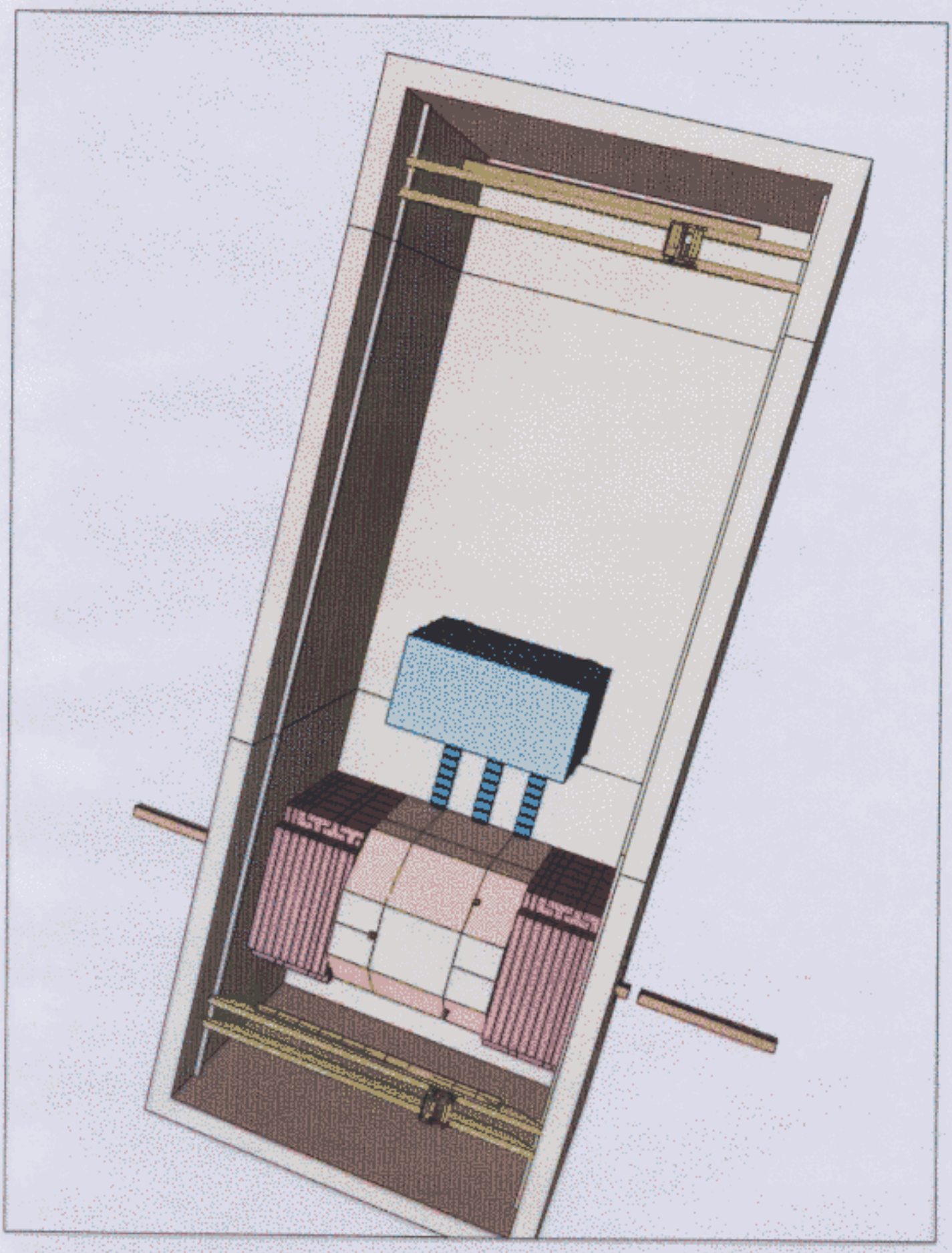
Detector-LayOut
Tesla
DESY-ZMEA
ver._3.2-9

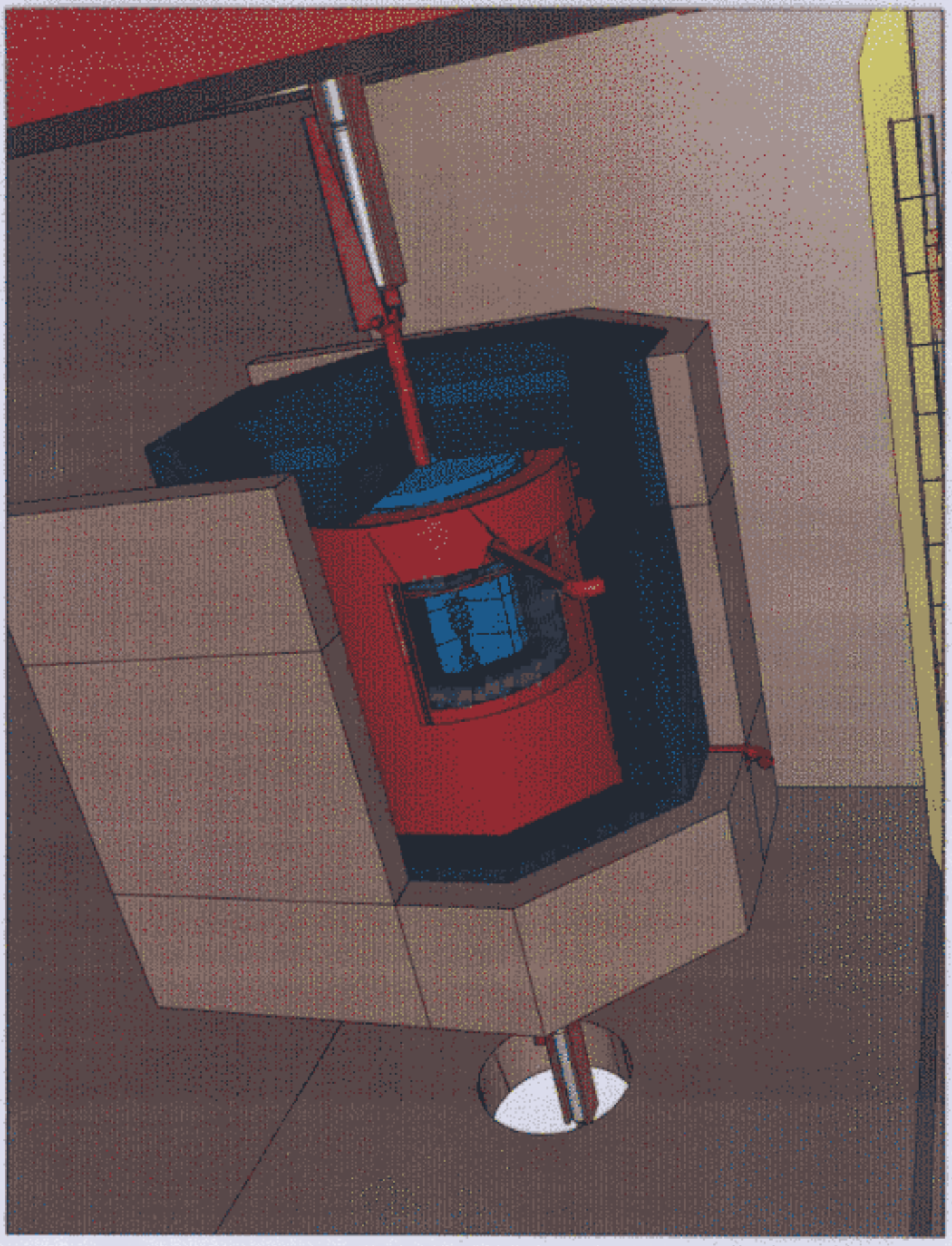


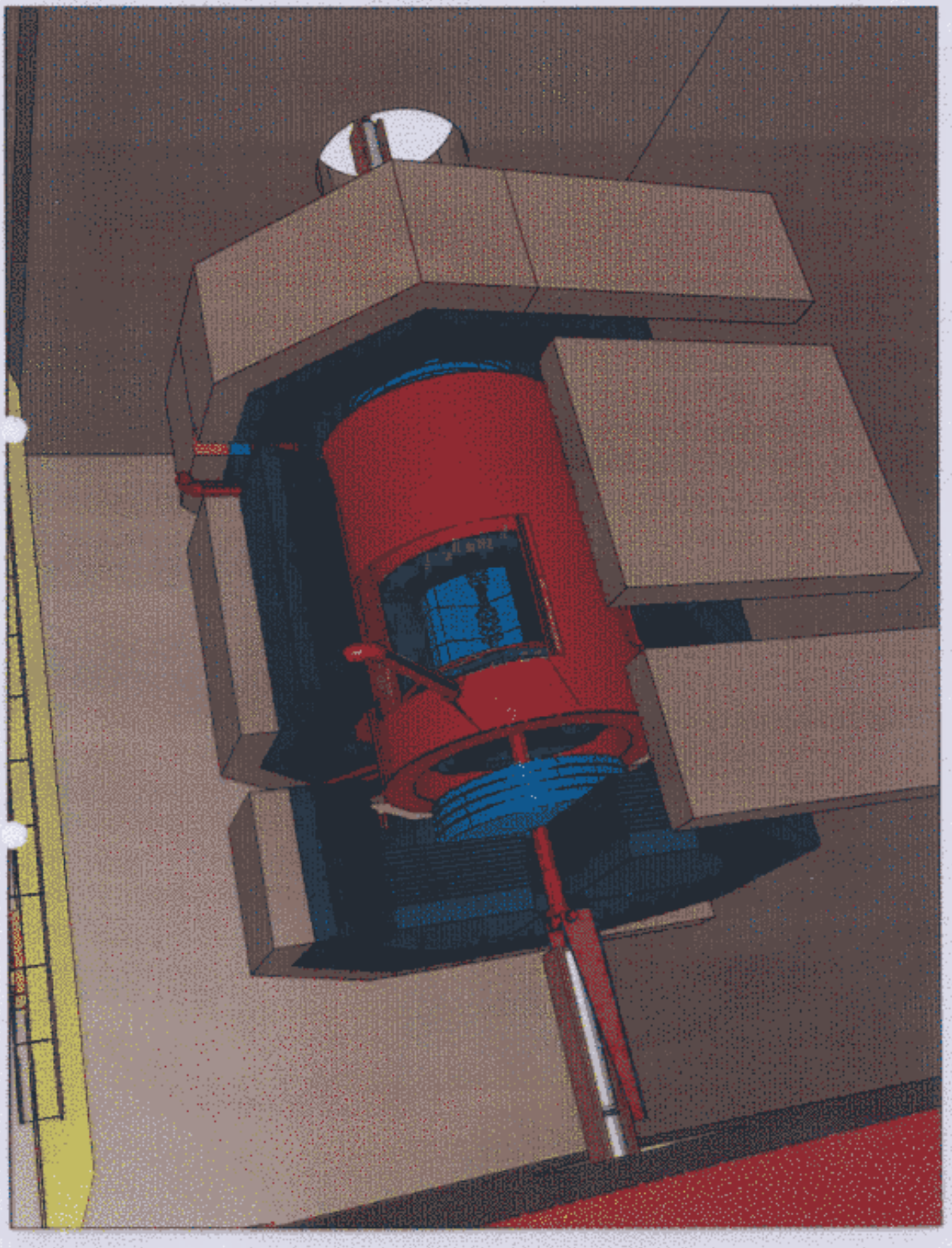


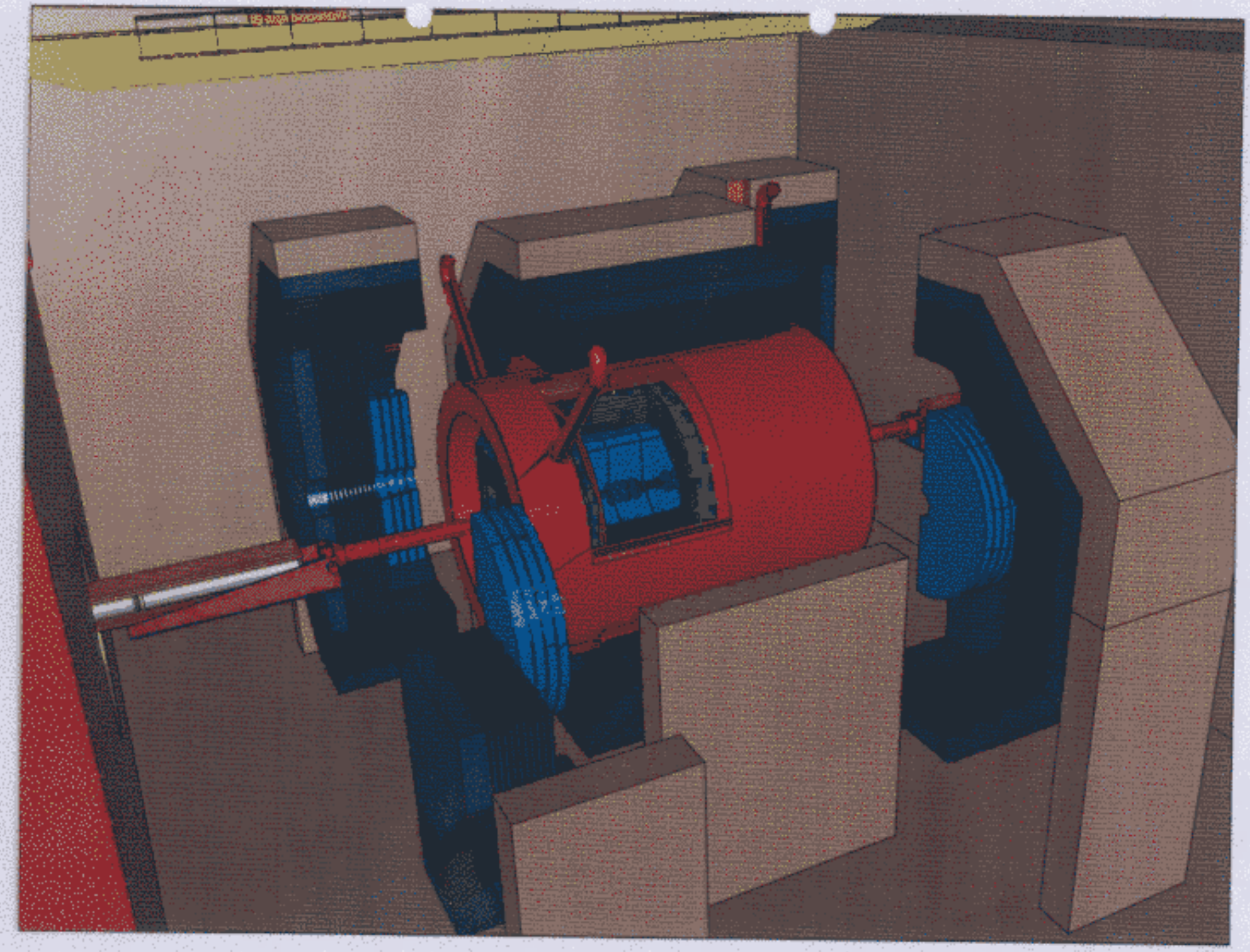


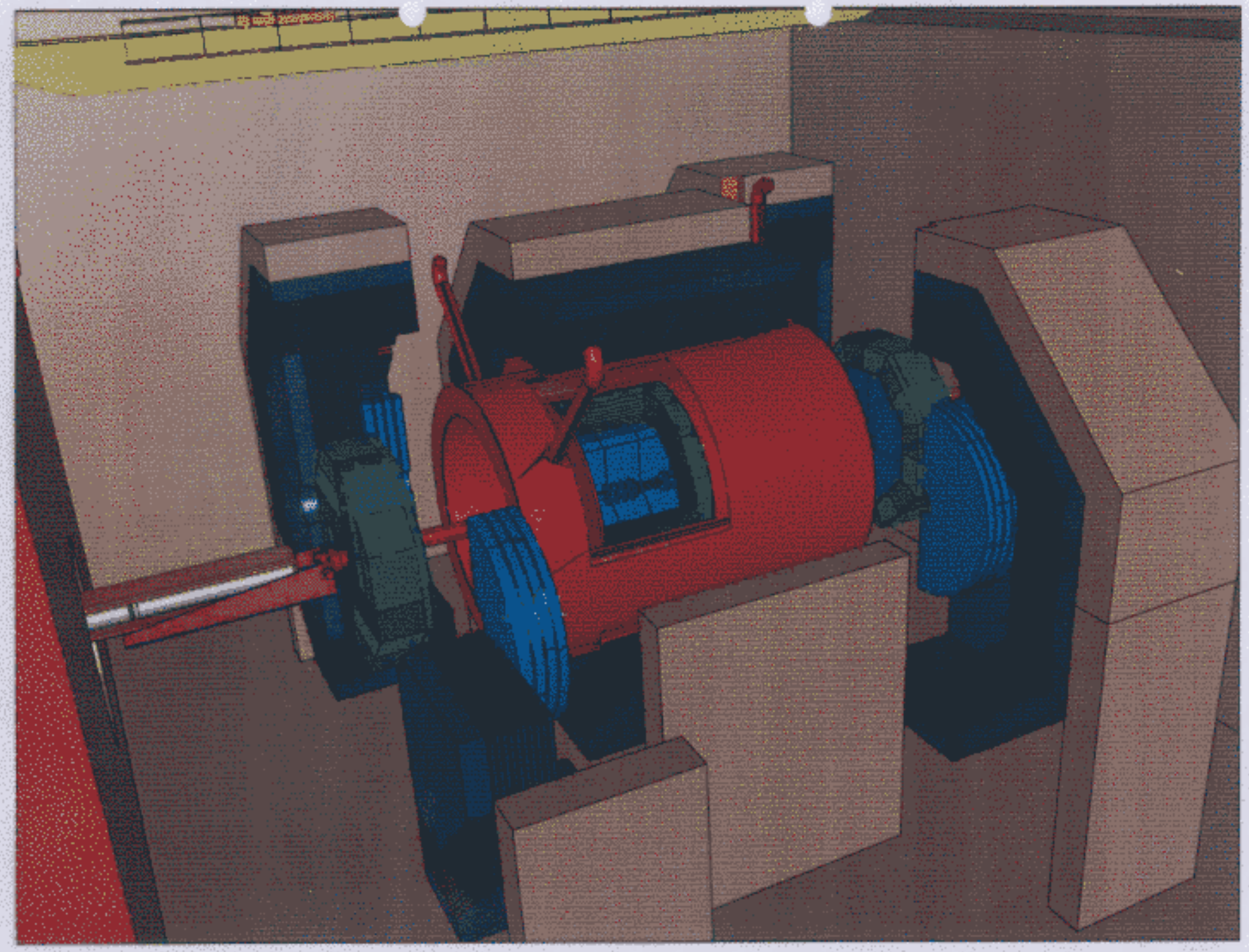


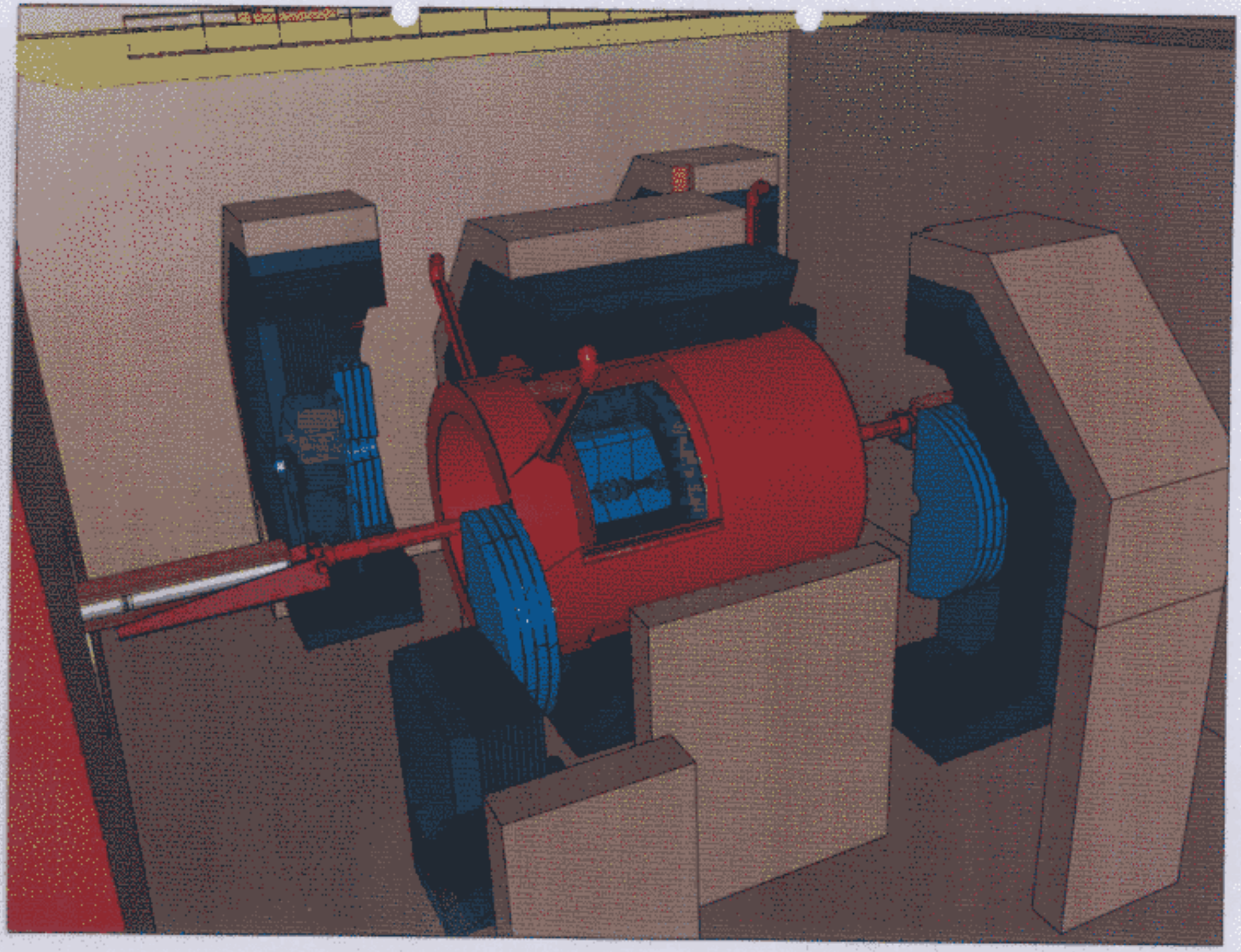


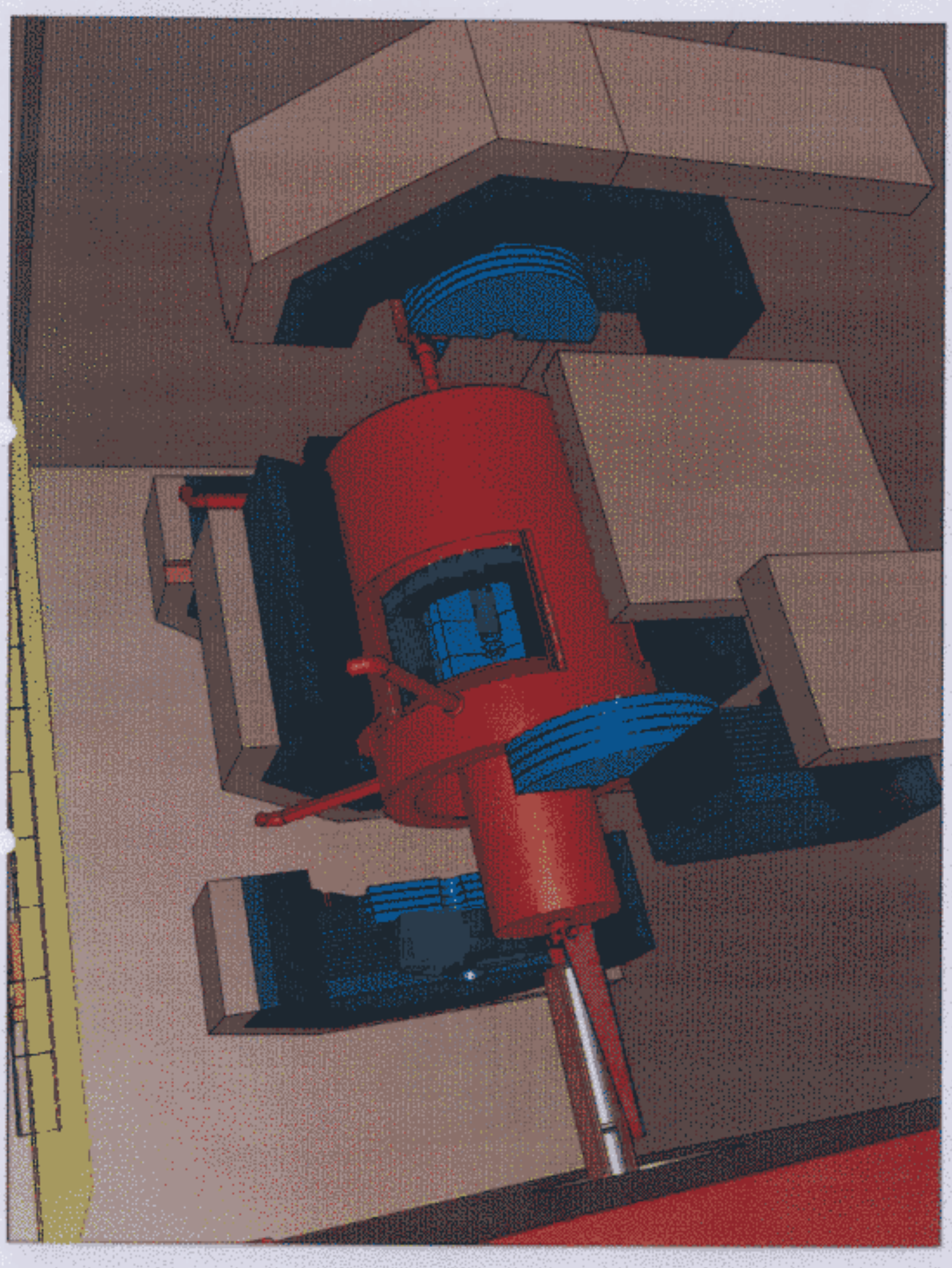


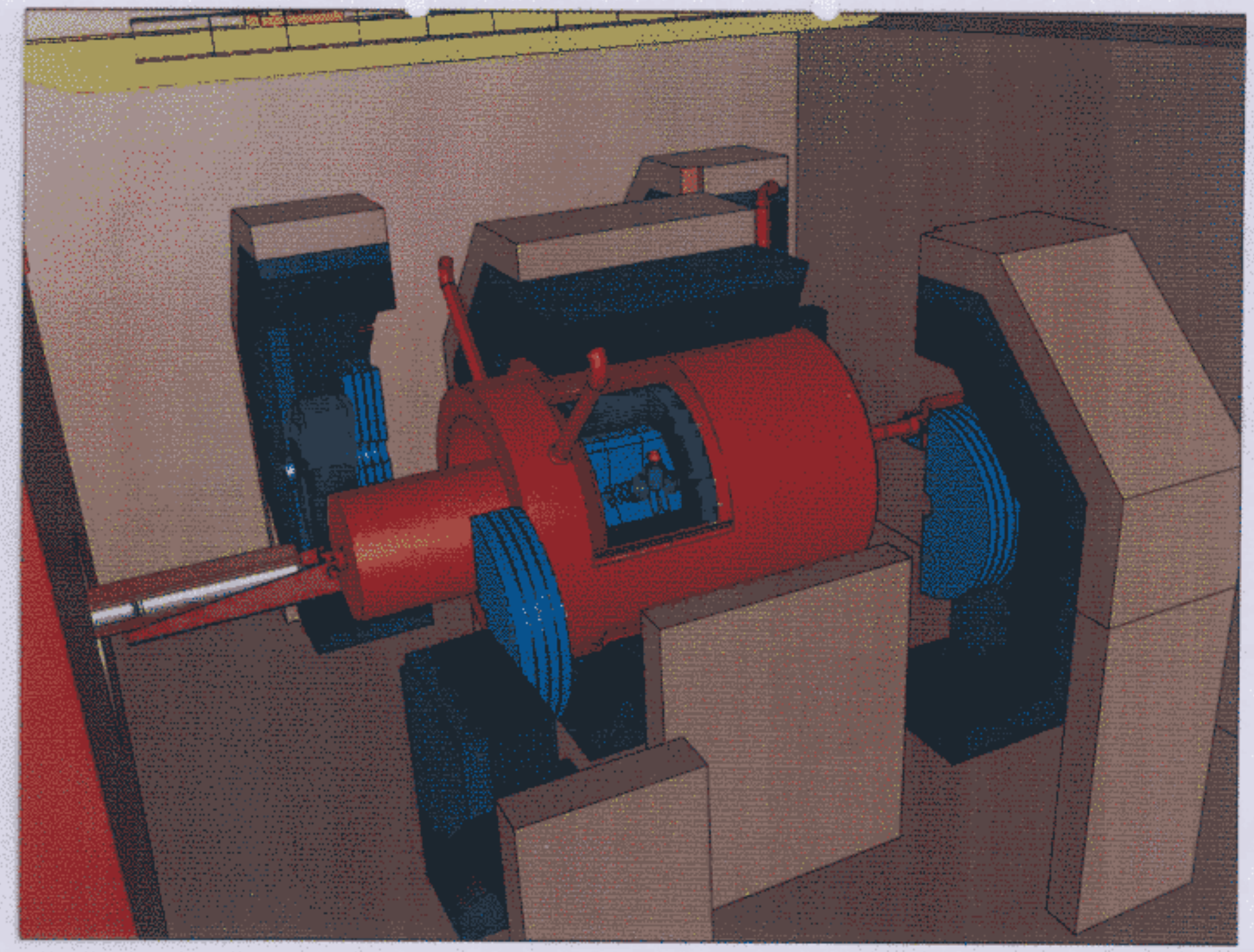


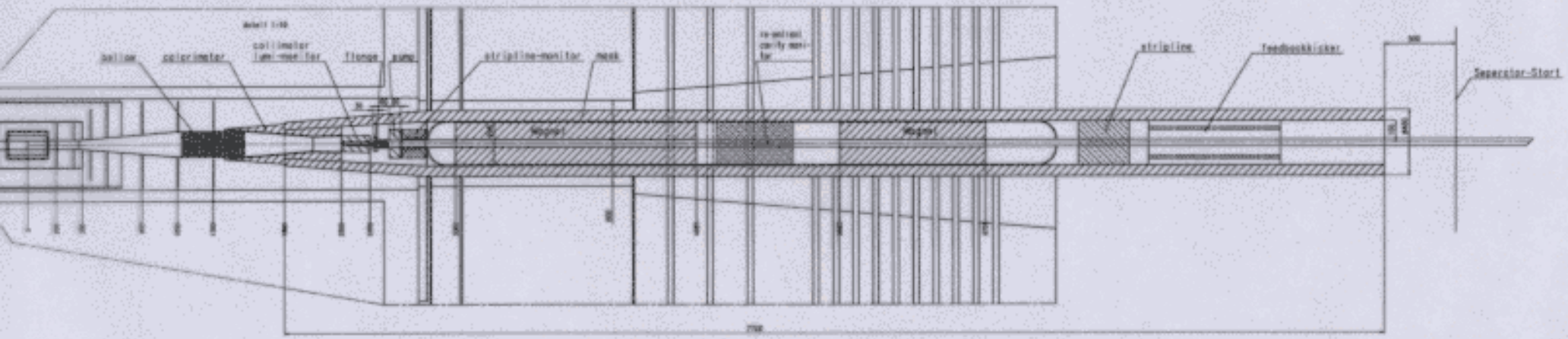


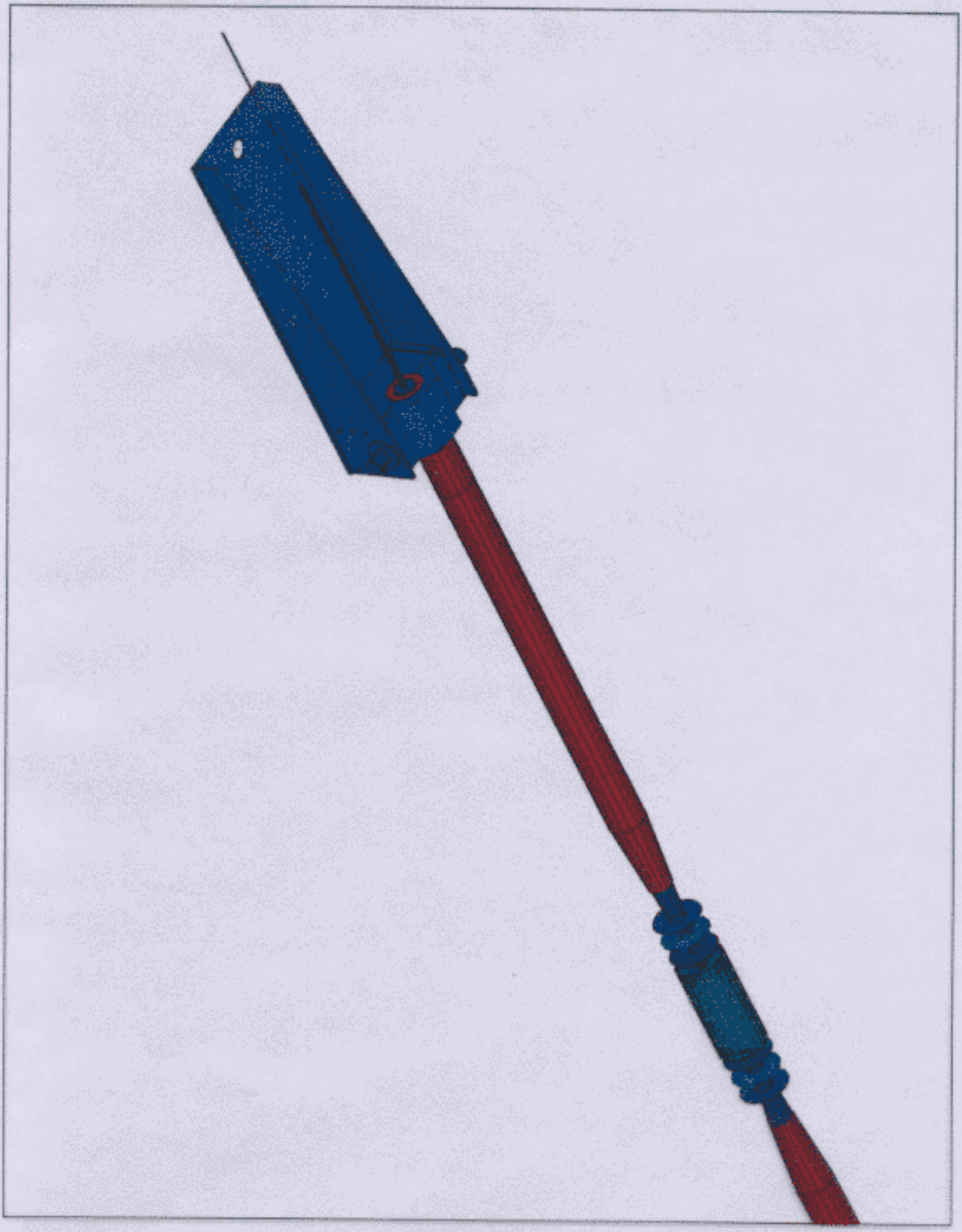




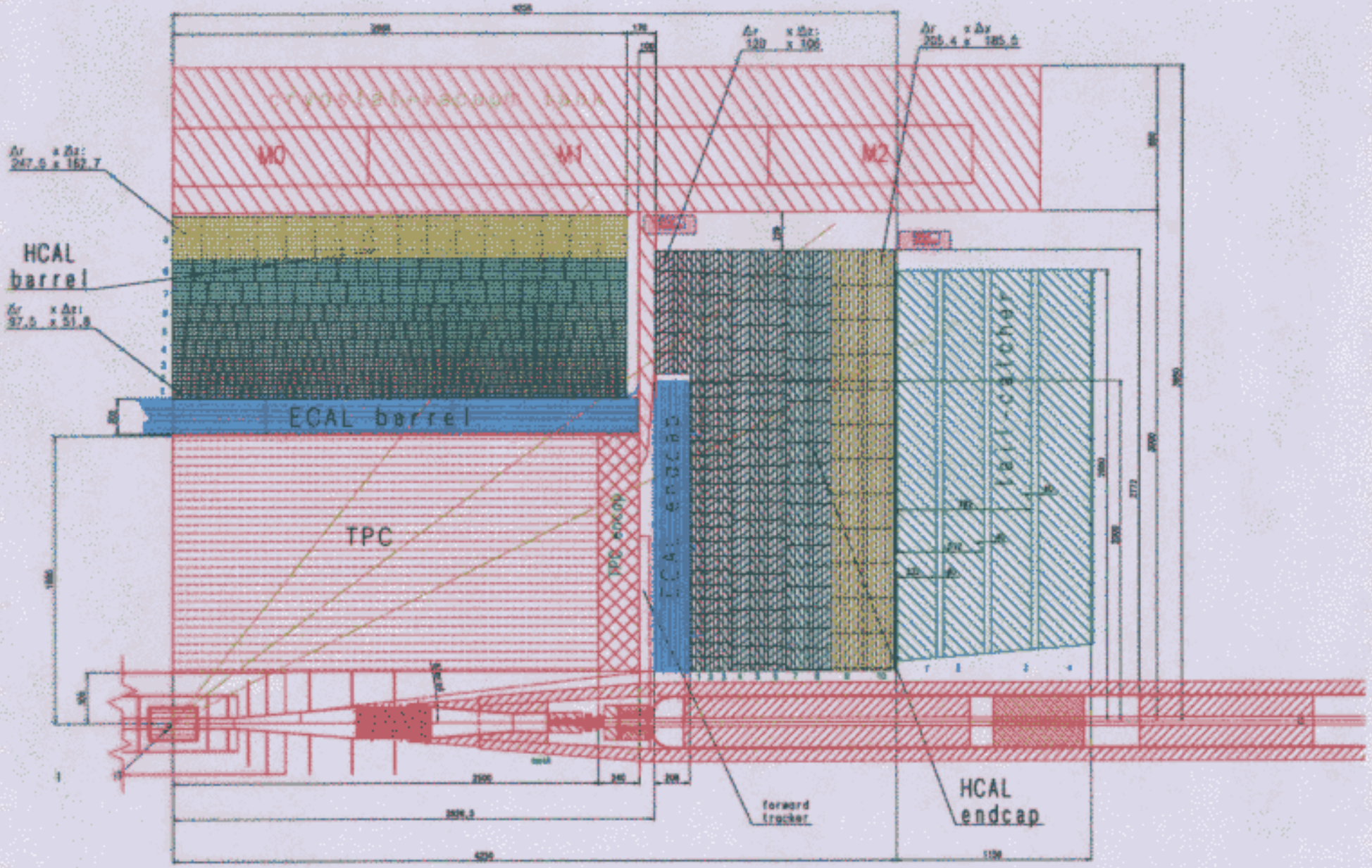


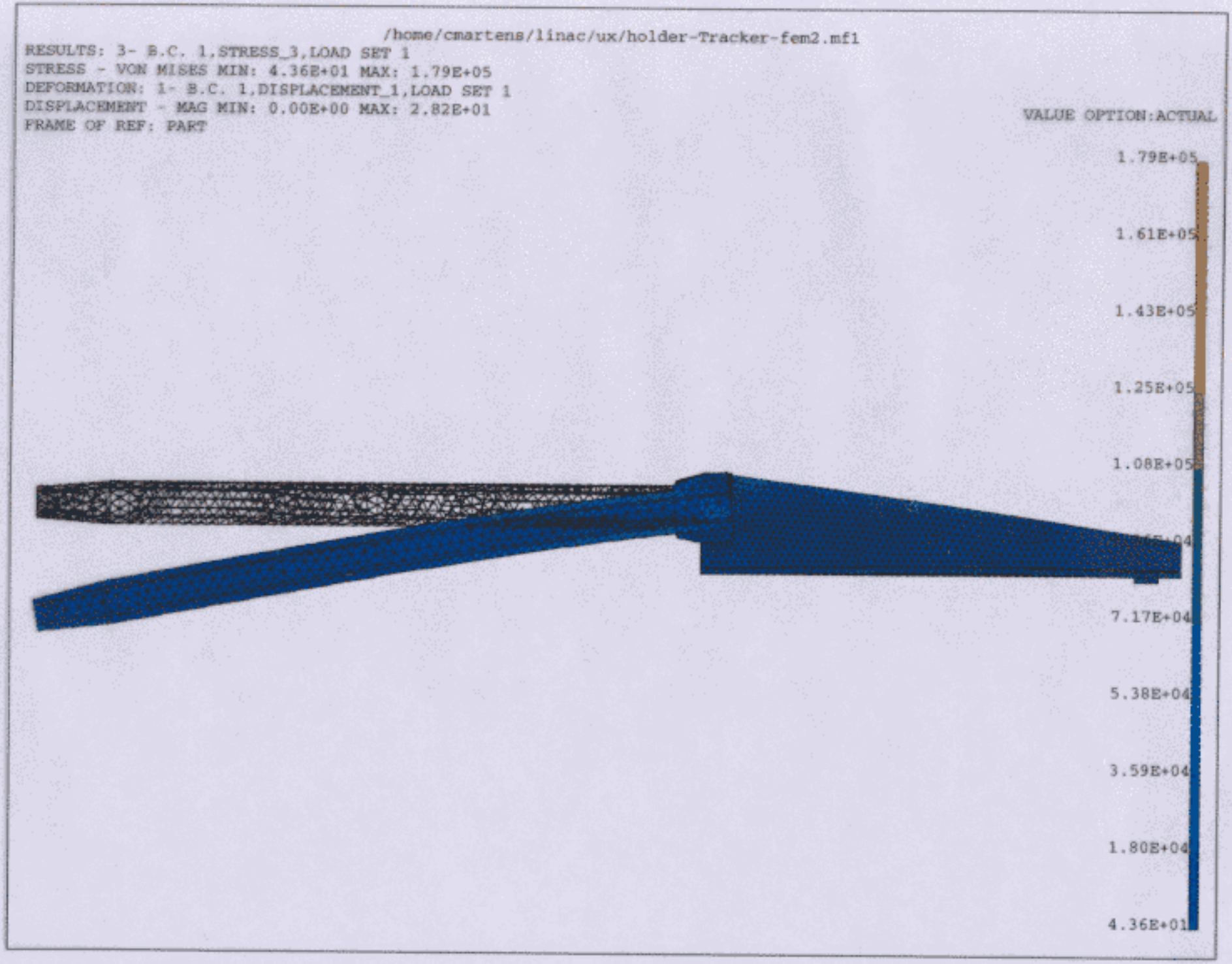



bellow
calorimeter
collimator
lum.-monitor
flange
pump
stripline-monitor
mask
re-entrant
cavity moni-
tor
stripline
feedthrough-kicker
Seperator-Start



longitudinal cut through the TESLA calorimeter

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RESULTS: 3- B.C. 1,STRESS_3,LOAD SET 1
STRESS - VON MISES MIN: 4.36E+01 MAX: 1.79E+05
DEFORMATION: 1- B.C. 1,DISPLACEMENT_1,LOAD SET 1
DISPLACEMENT - MAG MIN: 0.00E+00 MAX: 2.82E+01
FRAME OF REF: PART
VALUE OPTION:ACTUAL
1.79E+05
1.61E+05
1.43E+05
1.25E+05
1.08E+05
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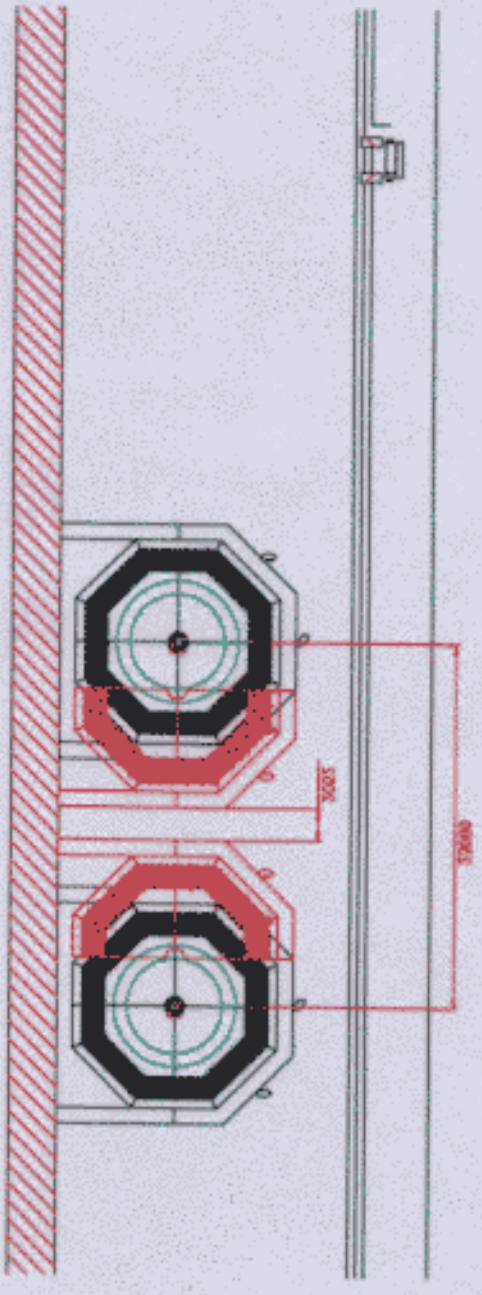
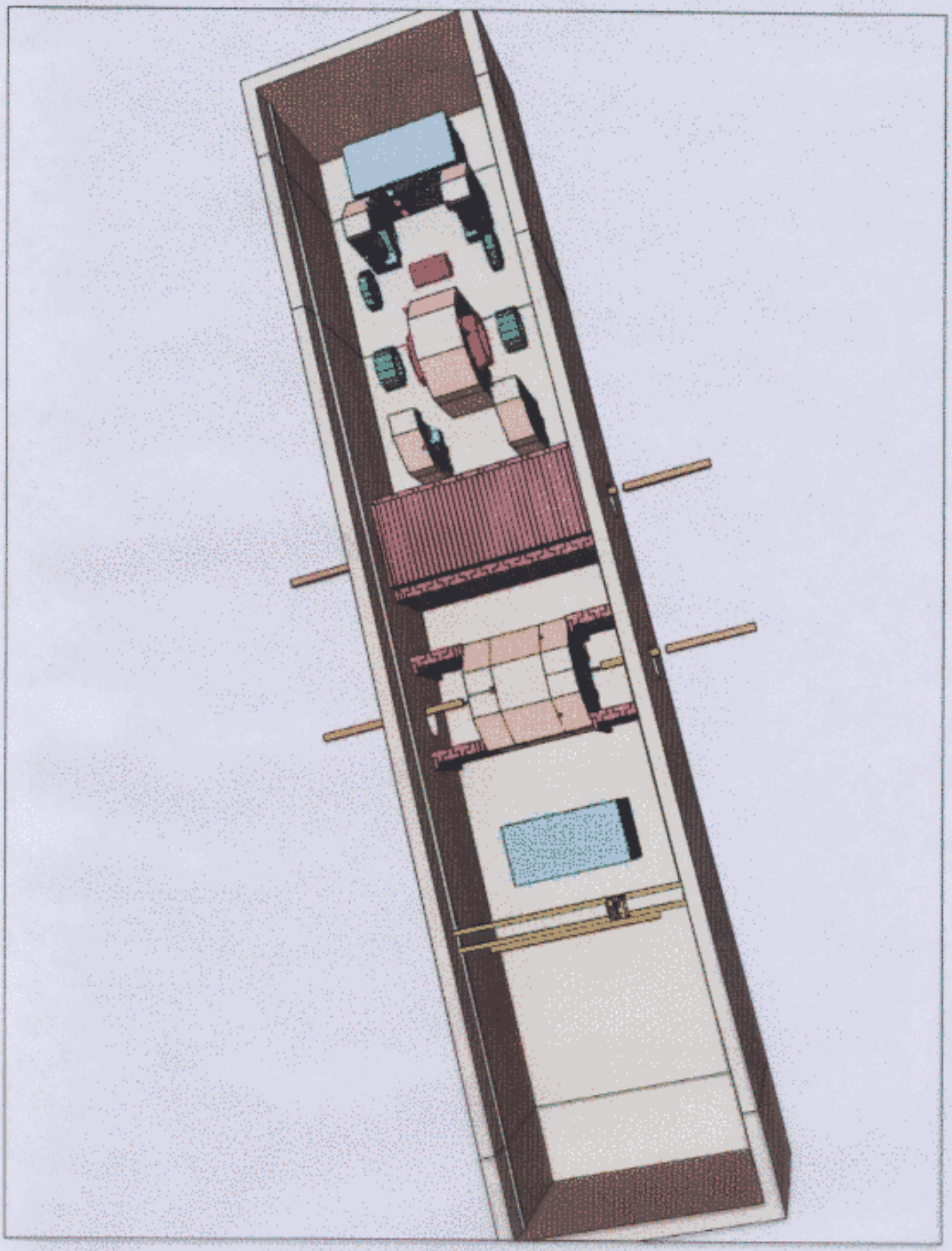
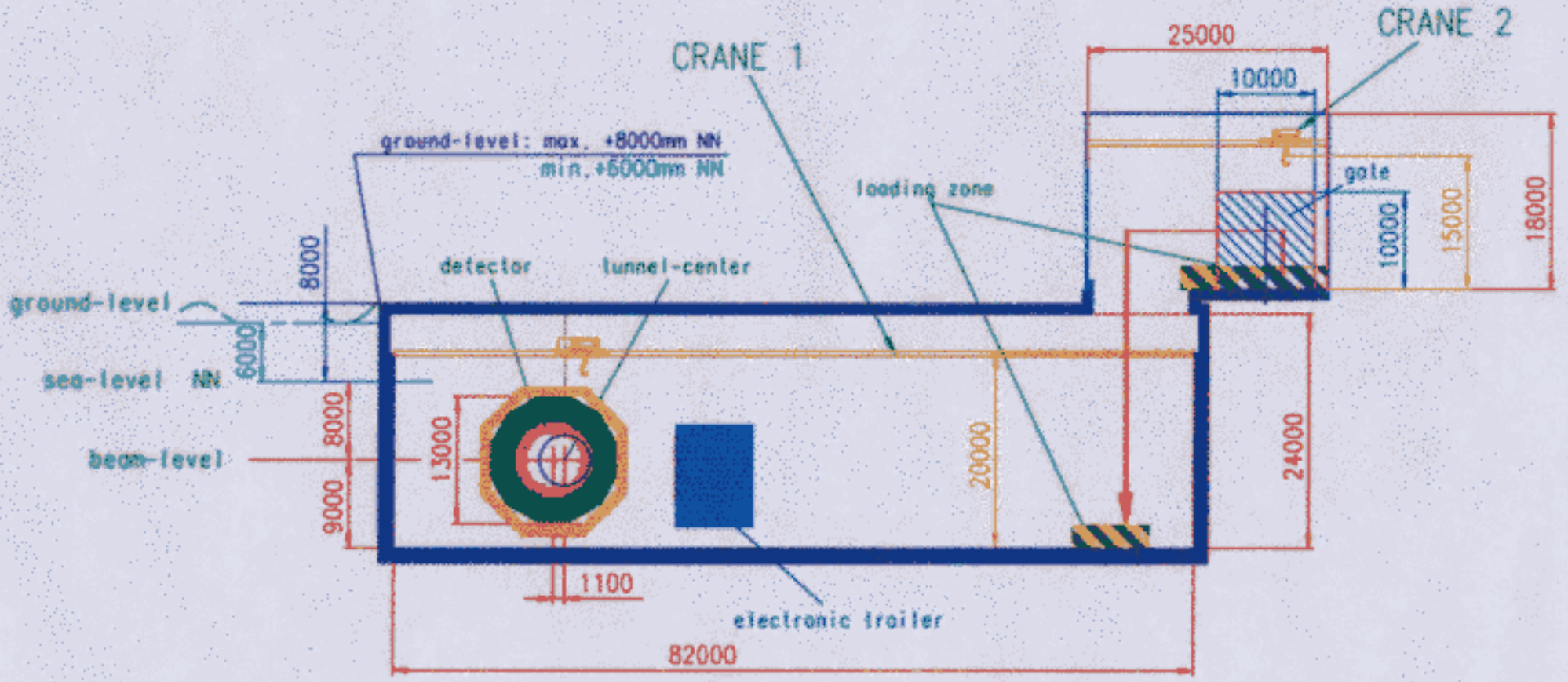
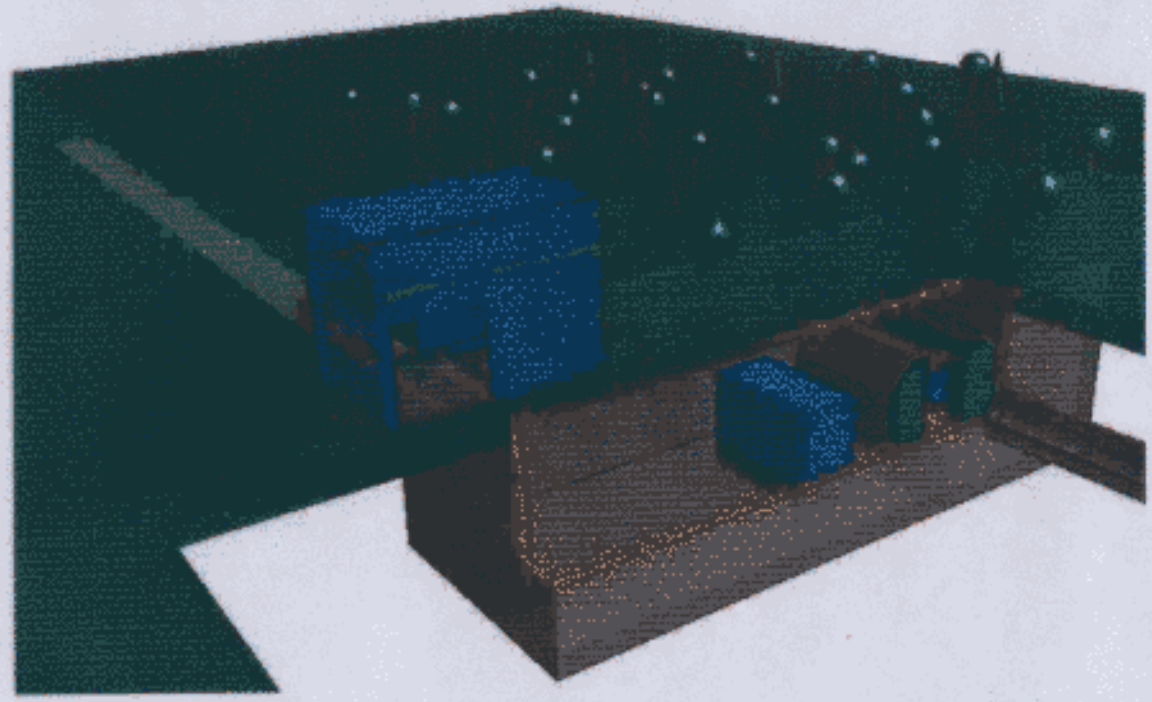
3.59E+04
1.80E+04
4.36E+01


1000
2000

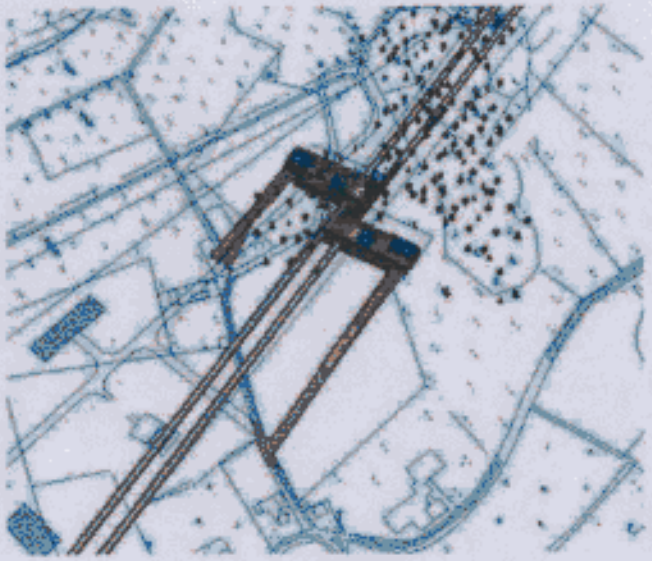


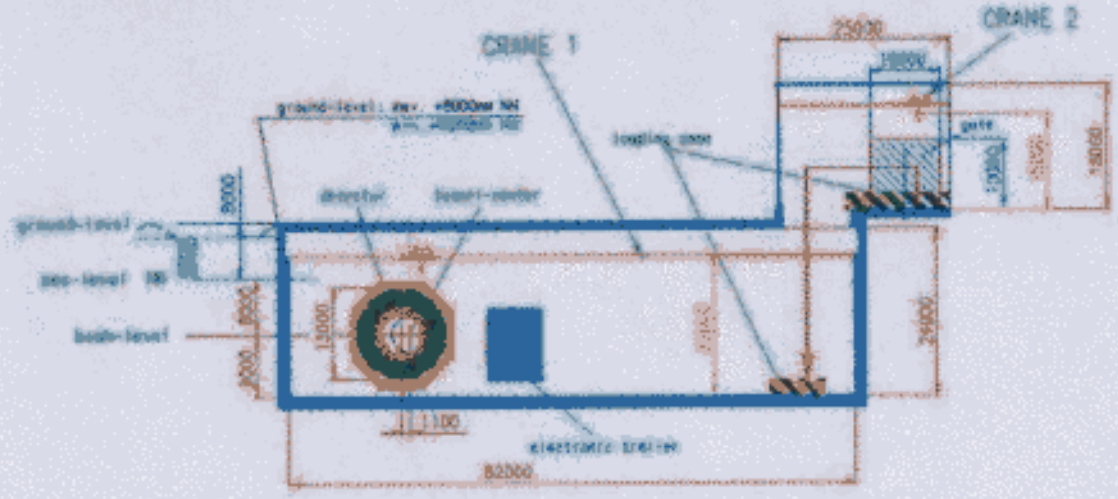

CRANE 1
CRANE 2
25000
10000
ground-level: max. +8000mm NN
min.+6000mm NN
loading zone
gate
10000
15000
18000
8000
detector
tunnel-center
ground-level
6000
sea-level NN
8000
beam-level
13000
9000
20000
24000
1100
electronic trailer
82000

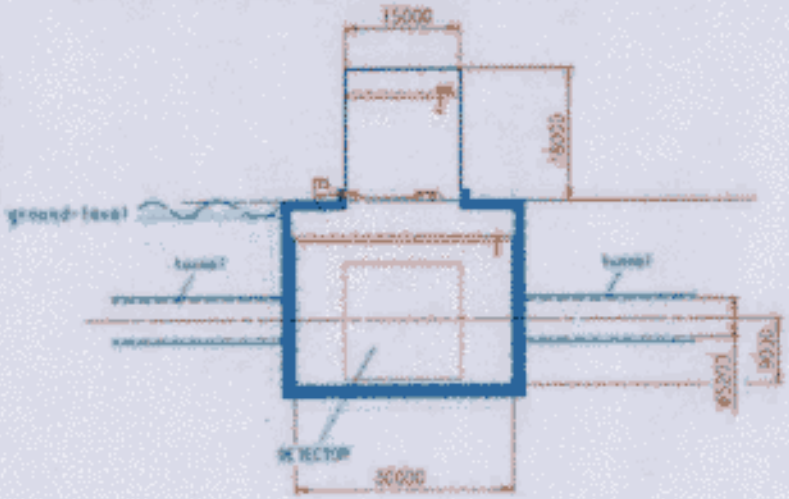
DETECTOR-HALL-LAYOUT



Version 1

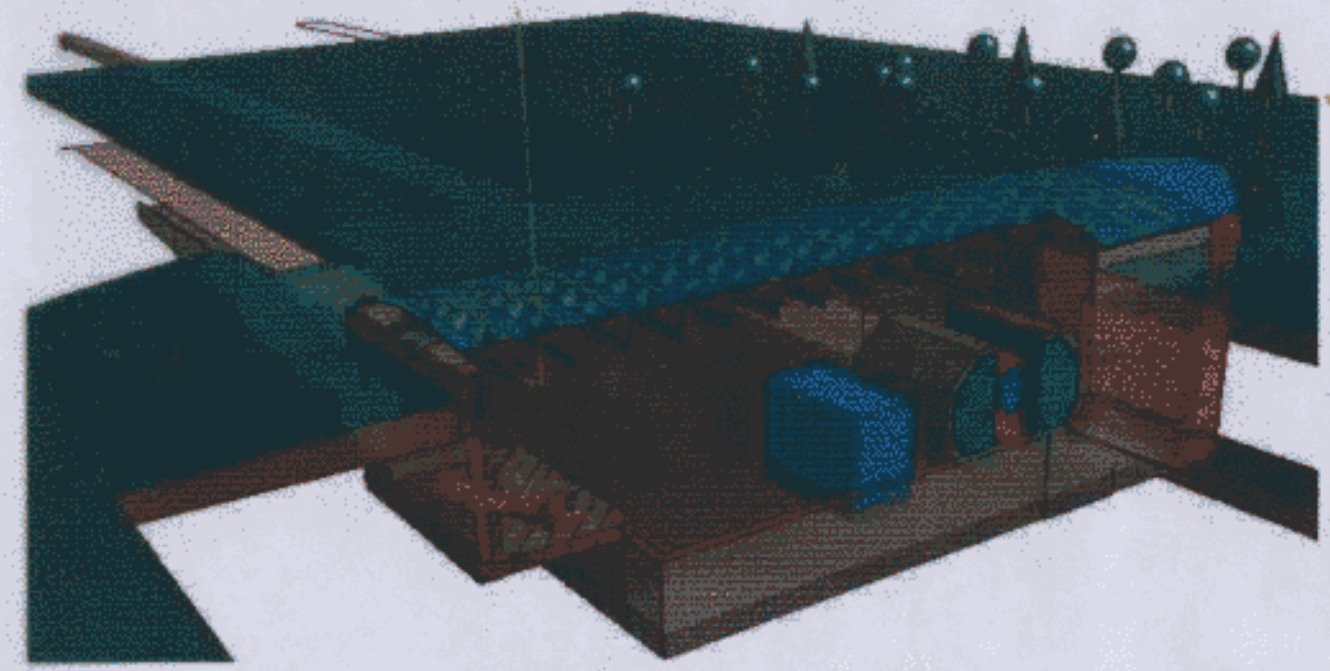


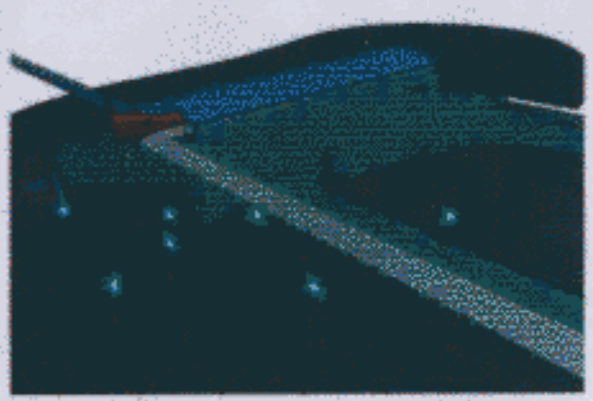


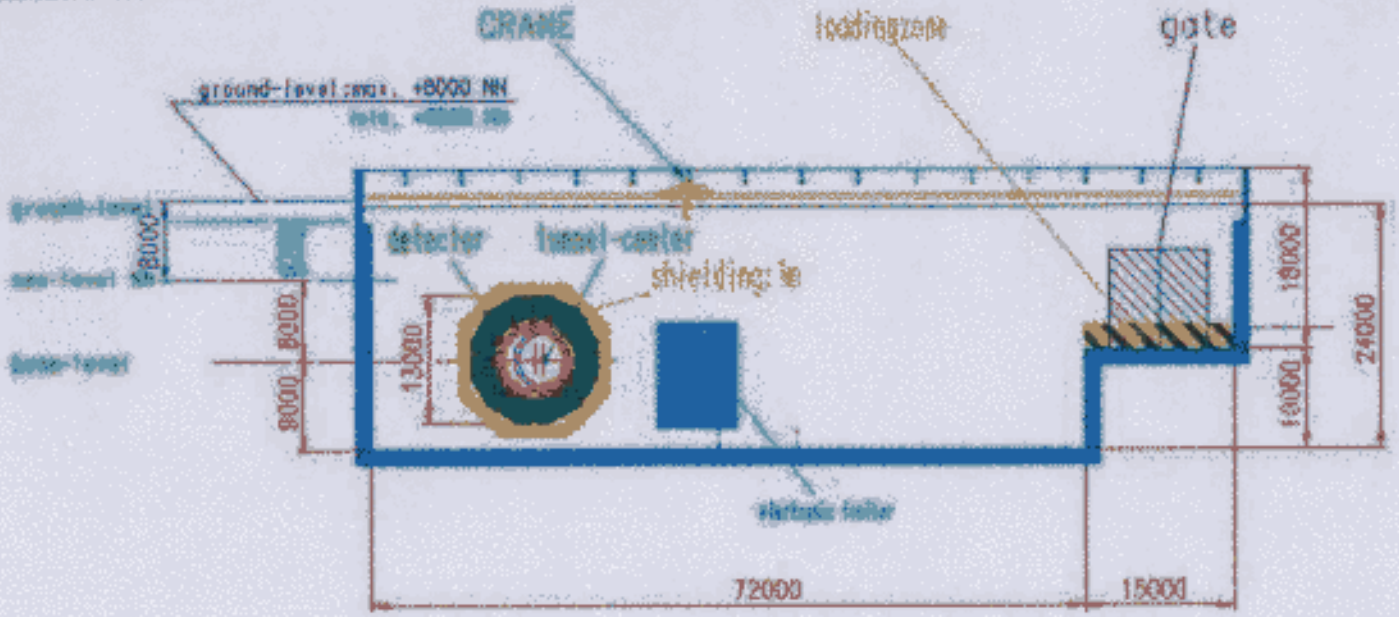


DETECTOR-HALL-LAYOUT

Version 3







DETECTOR INTEGRATION

Experimental Hall

The detector size and the various operational detector configurations – assembly and test in a parking position, data taking and detector maintenance in the beam position – lead to the following dimensions: •hall-width in beam direction 30 m,• hall-length perpendicular to the beam 82 m, •beam height 8 m above floor, •crane-hook 19 m above floor. The beamline divides the hall into a long 66 m section and a short 16 m section The long section will allow a detector assembly or detector upgrade with the interaction region shielded by movable concrete blocks. Commissioning of the linac and machine studies are therefore completely independant of the detector assembly status in the parking position.The length of the short section is defined by the open position of the detector in the interaction region to allow access the vertex region .Two cranes with a capacity of 80 tons each are foreseen for the handling of heavy items.
Fig.1 shows a scetch of the detector assembly arrangement in the parking position with the installation area shielded against radiation from linac operation by a system of concrete blocks.

Detector Mechanical Concept

The detector consist of five parts moving independently on air pads. The central yoke ring holds the coil cryostat with the calorimeter HCAL + ECAL and the central tracking chamber TPC inside. The four corner half-shells close the iron return yoke.The vertex detector and inner tracker are fixed to to the central beampipe. This concept allows access to the vertex and inner tracking systems while the detector is in the interaction region with the central detector beampipe still connected to the linac machine vacuum. Fig.2 shows the principal scheme of the detector open layout in the beam position with the four half shells opened and the TPC removed in beam direction to clear the central beampipe section. The technical solutions for the mechanical detector concept and the different assembly and maintenance scenarios including support and moving mechanisms are described in detail in Tesla note ...
The detector is designed to be self-shielding. A layer of concrete about 1 m thick is mounted on the outside of the muon filter to stop slow neutrons. The machine sections between detector and linac-tunnel are shielded by movable concrete blocks. The detector electronics are located in an 3 stories trailer coupled to the detector in a fixed distance. Fig.3 is an isometric view of the detector in the beam position (with one detector quadrant cut out and part of the shielding left out to show the structure of the detector arrangement).