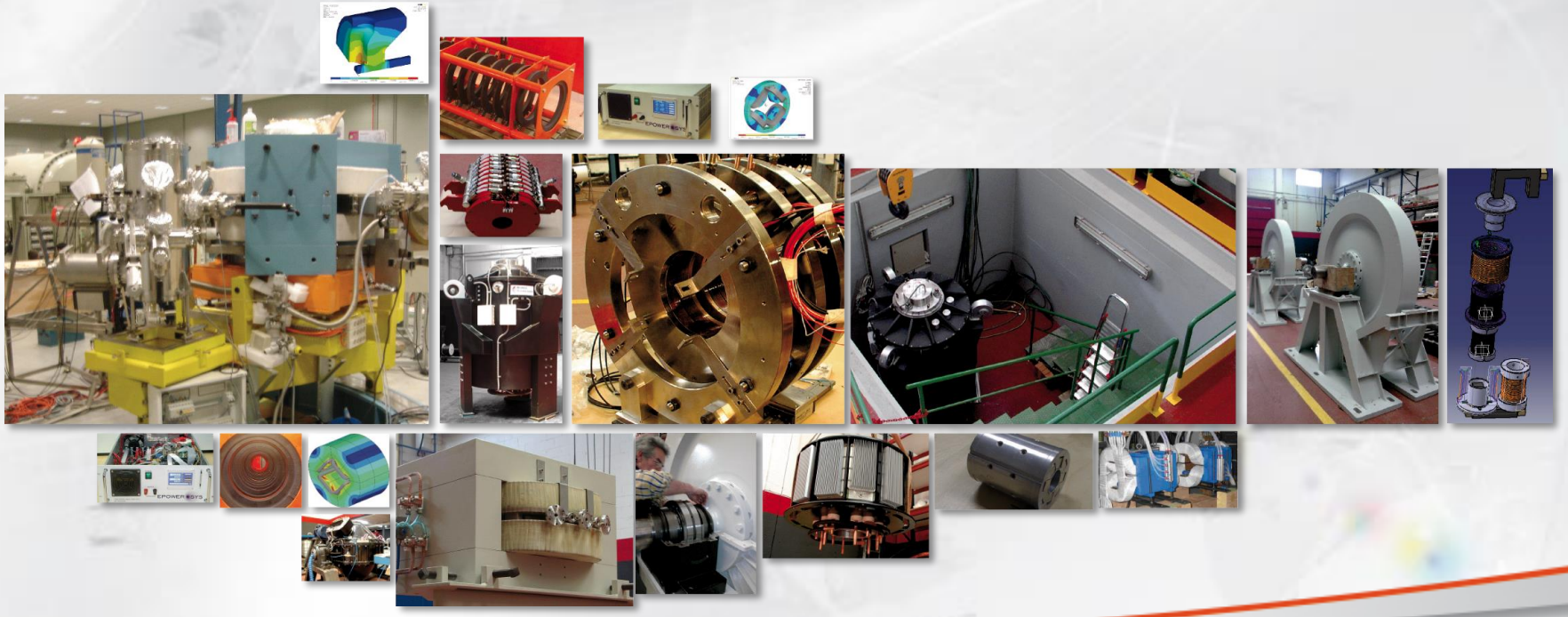
ELYTT ENERGY

Is an independent Spanish company composed by two business units:

ENGINEERING & MANUFACTURING



Calle Orense 11, 2 º B - 28020 Madrid - Spain - Phone: +34 91 411 09 63 - Fax: +34 91 411 09 64 - www.elytt.com

Location

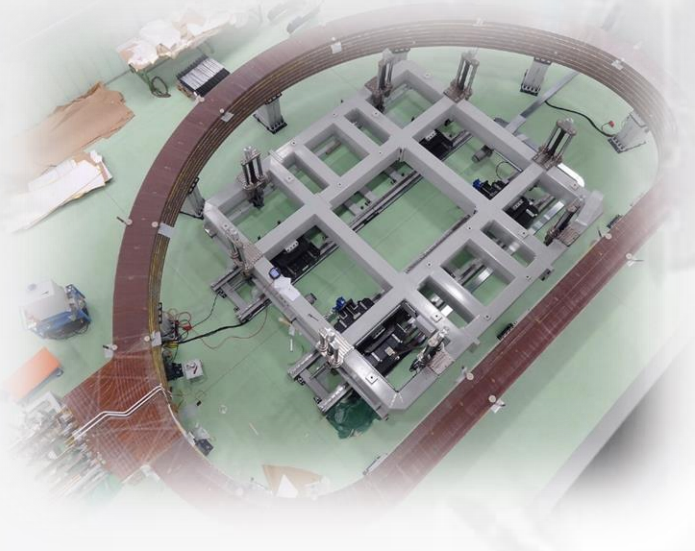
Manufacturing (Artea & Llodio)

Business & Engineering (Madrid)

MARKETS. what we do?

- **Elytt Energy designs and manufactures resistive and superconducting magnets and power supplies for particle accelerators of all types.**

- **Designs and manufactures fusion reactor Toroidal and Poloidal Field coils.**



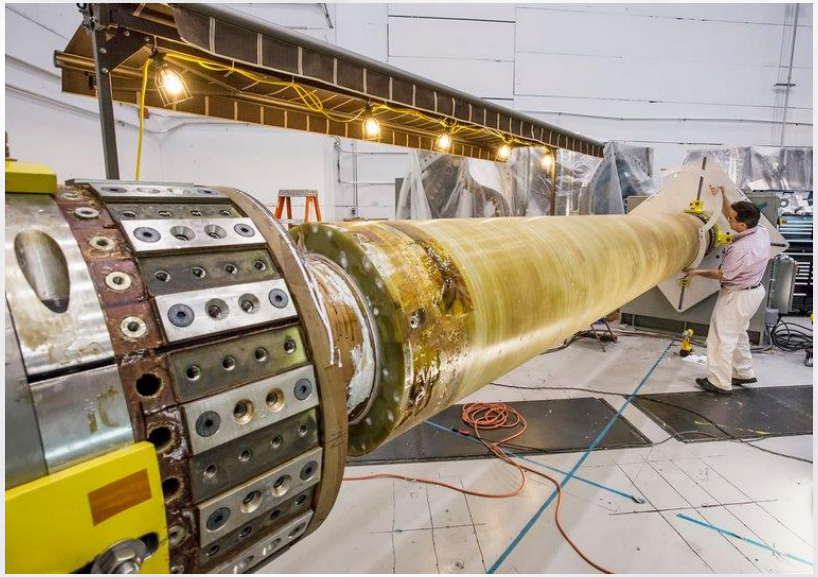
- **Engineering Services:**
  - 2D and 3D FEM and analytical electromagnetic calculations.
  - 2D and 3D FEM and analytical stress calculations.
  - 2D and 3D FEM and analytical thermal calculations.
  - Ray tracing.
  - Vacuum calculations.
  - Dynamics.
  - Coil cooling calculations.
  - Cryogenic calculations.
  - Support frame calculations.

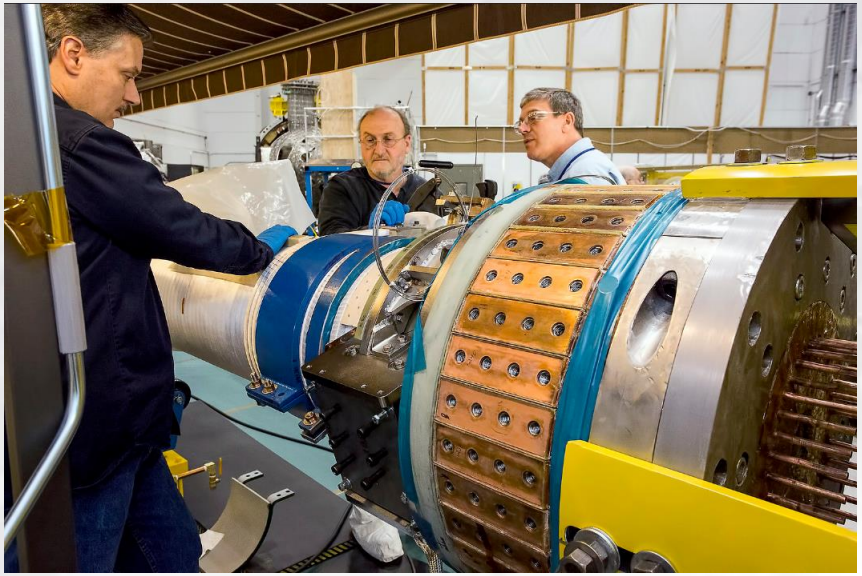
CLIENTS

- **F4E/ITER***(Europe).*
- **CERN** *(Europe)*
- **FAIR / GSI** (Germany).
- **CORNELL**(USA)
- **CEA** (France).
- **ILL** (France)
- **CIEMAT** *(Spain).*
- **ESS Bilbao** *(Spain).*
- **ESS Lund** *(Sweden)*
- **INFN Legnaro** (Europe)
- **BARC** (INDIA)
- **ALBA** (Europe)

- **TF/OH magnet bundle fabrication for Princeton Plasma Physics Laboratory for National Spherical Torus Experiment (NSTX) Upgrade**

- **ELYTT ENERGY awarded a contract to provide all necessary material, equipment, labor and supervision and perform the requirements of PPPL Statement of Work for "Toroidal Field/Ohmic Heating Magnet Bundle Fabricationing**



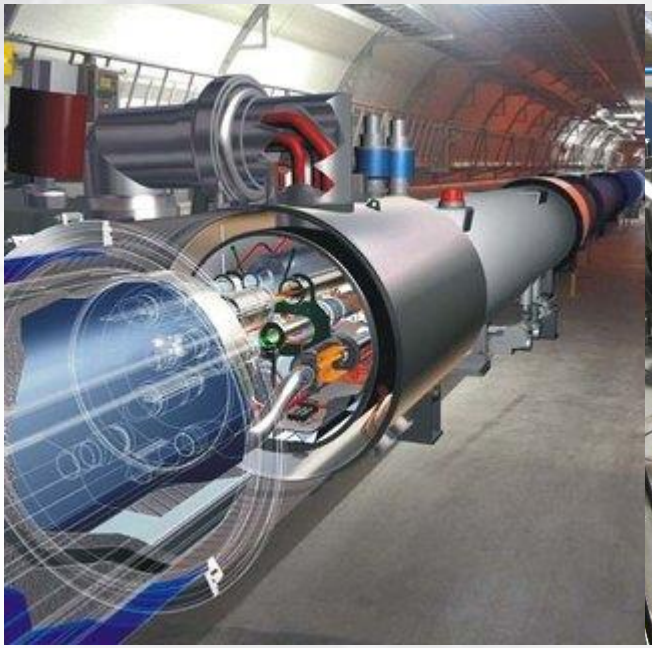


Superconductors magnets orbit corrector MCBXF for the upgrade of the HL LHC at CERN for CIEMAT

- **ELYTT ENERGY is manufacturing 6 long orbit corrector MCBXFA and 11 short orbit corrector MCBXFB superconductors combined dipoles operation in X -Y square.**

  The magnetic length is 1.2 m for the short version (MCBXB) and 2.2 mfor the long one (MCBXA)

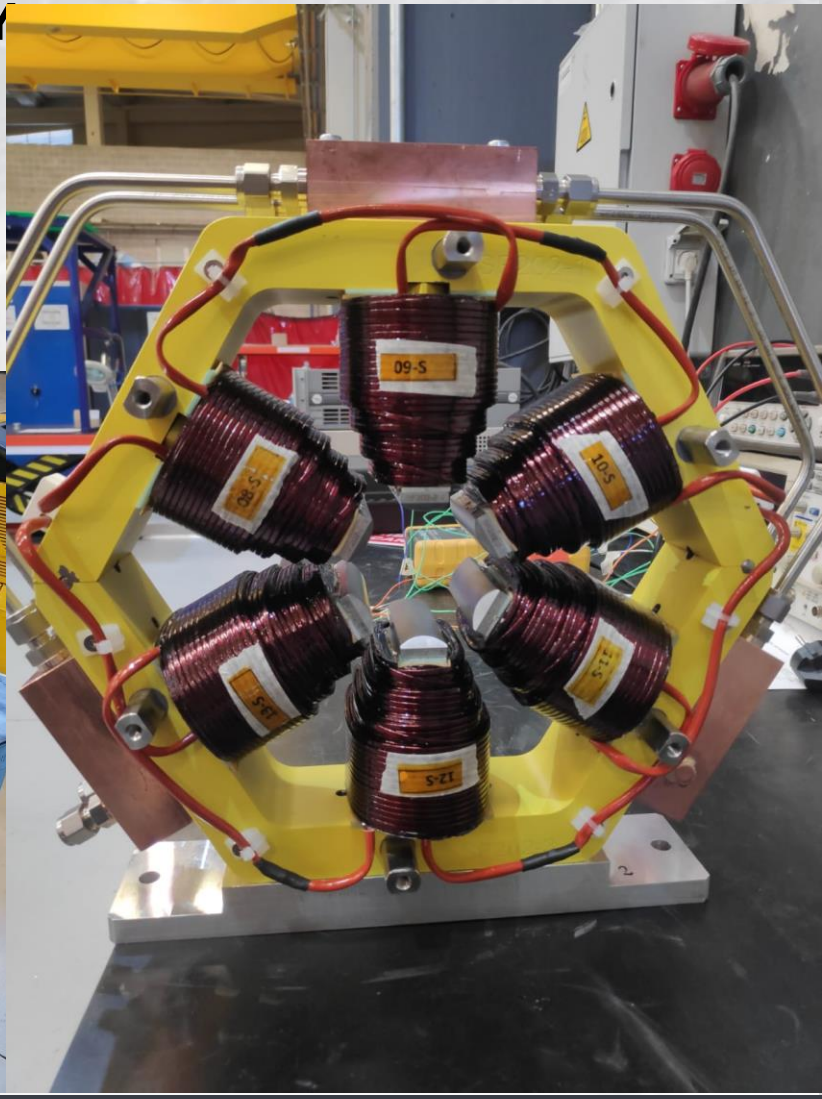
- **The value of the contract is approximately 5 million euros**



ELYTT ENERGY

78 SEXTUPOLE MAGNETS FOR THE IOATA RING LONG YOKE GEOMETRY AND SHORT YOKE GEOMETRY

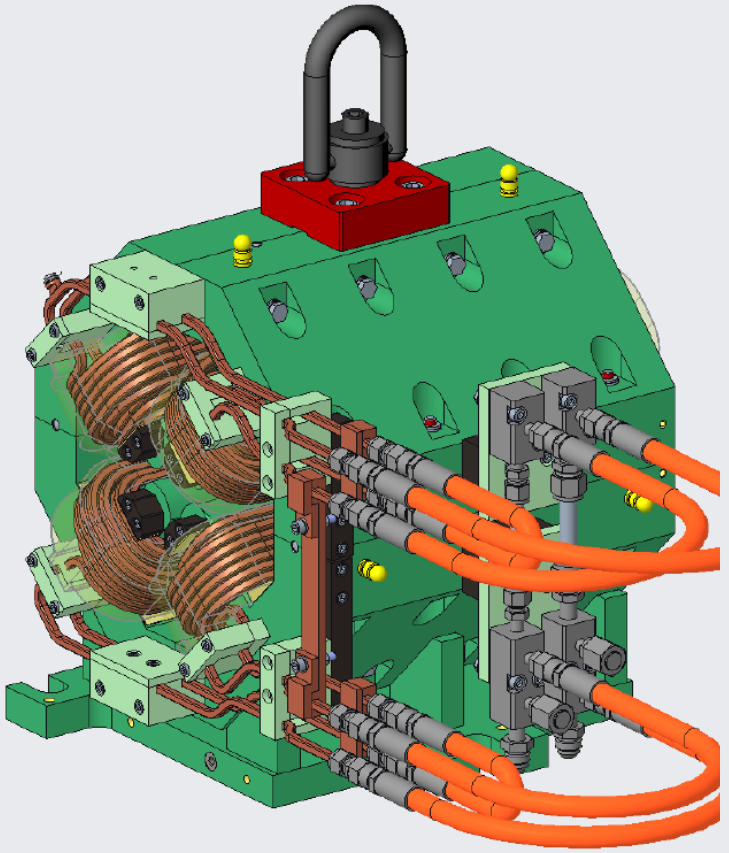
- **ELYTT designed and manufactured 8 Sextupole magnets for the IOTA ring long yoke geometry and 3 Sextupole magnets for the IOTA ring short yoke geometry.**

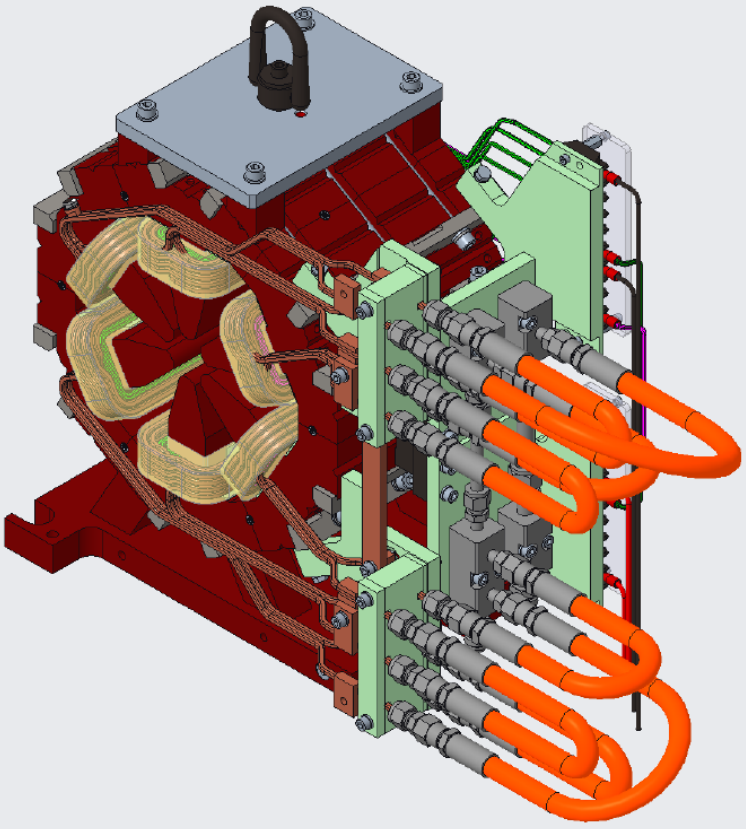


78 Quadrupoles and 52 Sextupoles for Advanced Light Source Upgrade at the University of California, Lawrence Berkeley National Laboratory.

ELYTT ENERGY is manufacturing The AR magnets, that will be placed into 12 arc magnet bending sections to define the circular particle accelerator.

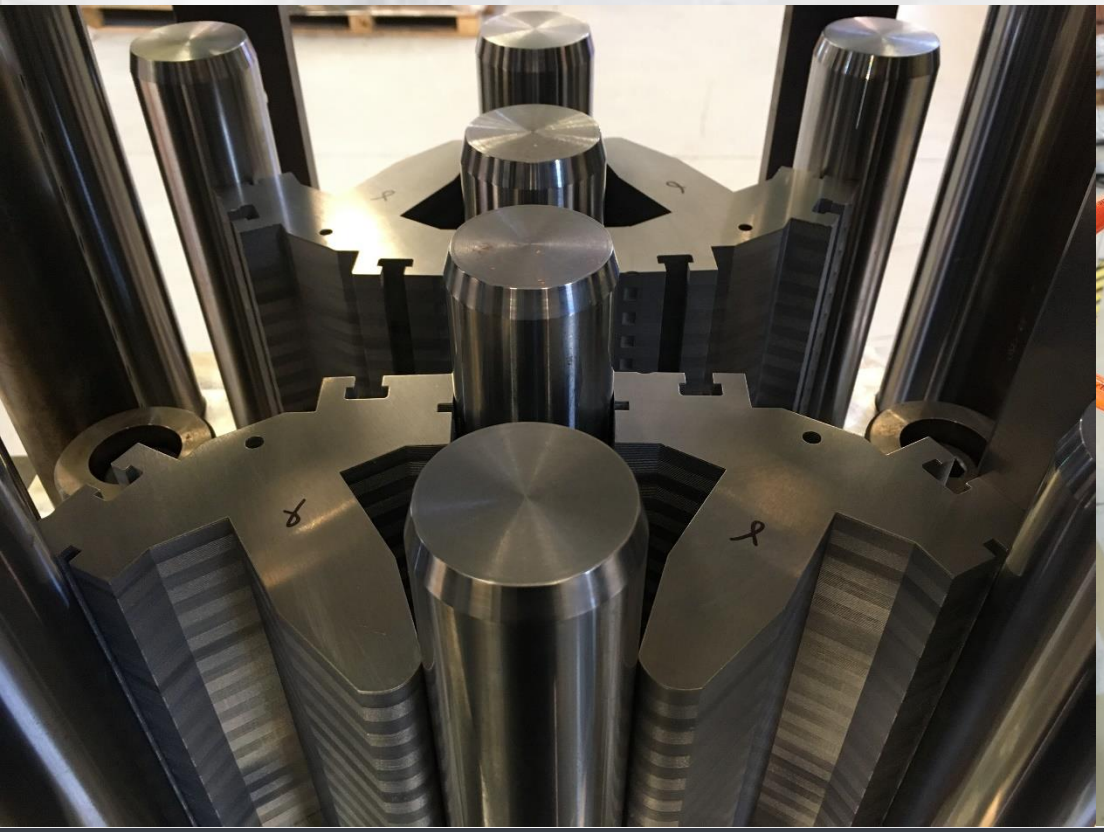
The AR is a circular electron-synchrotron storage-ring

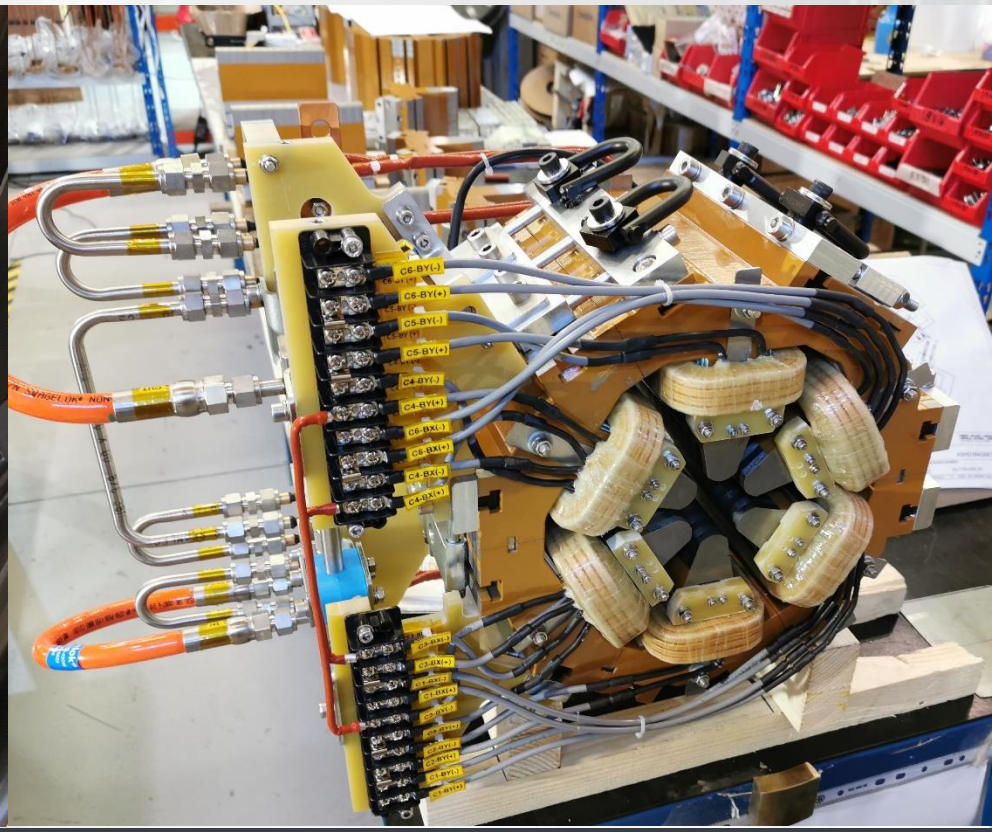




ELYTT ENERGY

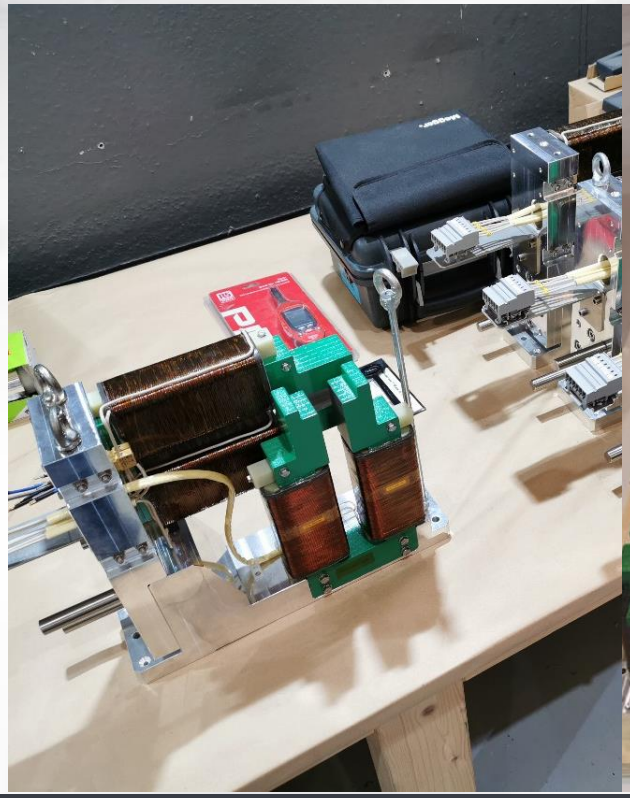
- **78 Quadrupoles and 52 Sextupoles for Advanced Light Source Upgrade at the University of California, Lawrence Berkeley National Laboratory.**

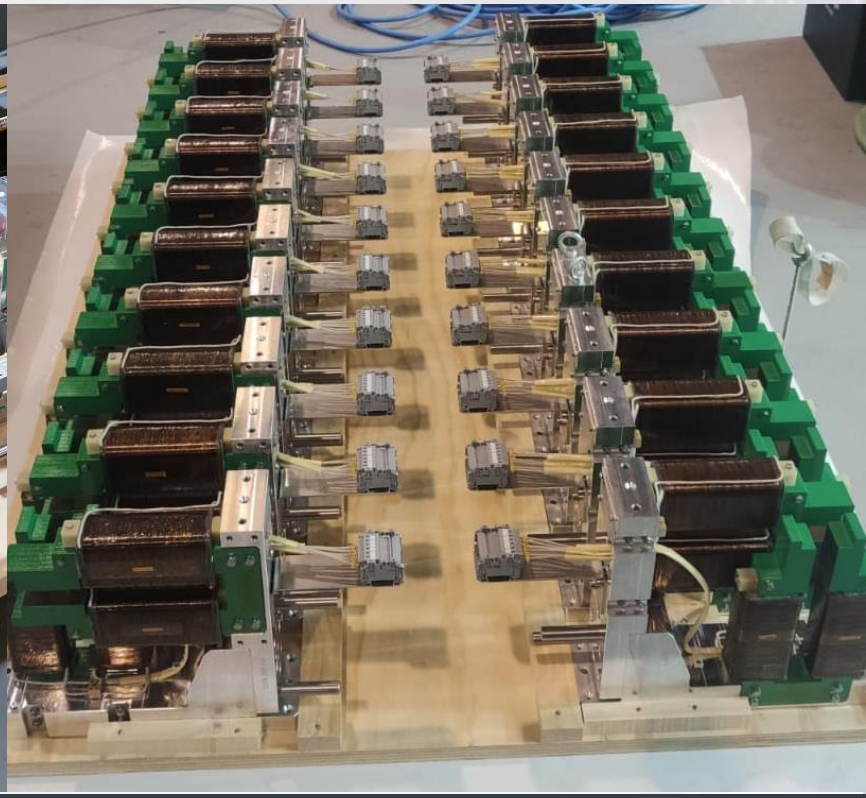




Steering Magnets for SLS2.0 for Paul Scherrer Institut

- **ELYTT ENERGY has manufactured for PSI for its new Light Source 117 units of the air-cooled steering magnets.**





Dipole Magnets for the Super Fragment Separator project at FAIR

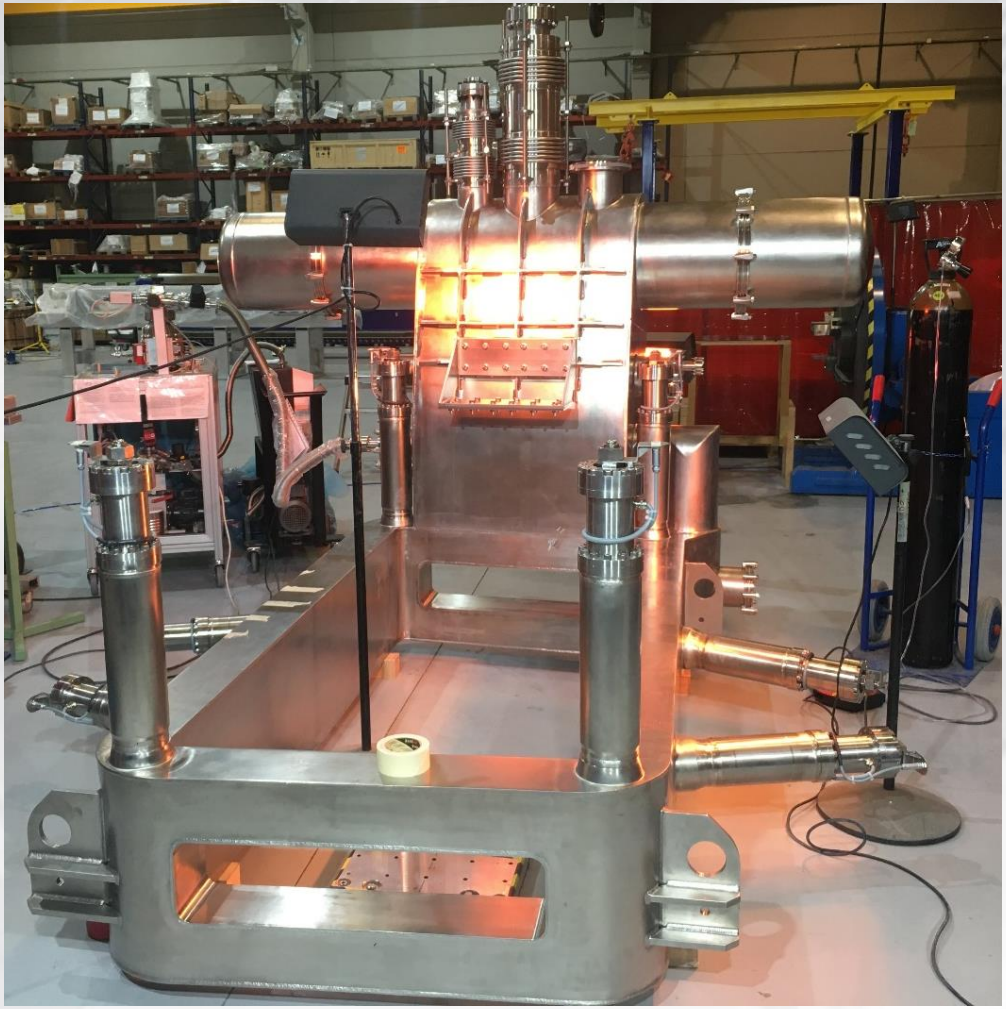
- **Elytt Energy design and is manufacturing a contract to FAIR (Facility for Antiproton and Ion Research in Europe GmbH), for supply 21 Superconductor Superferric dipoles. Magnets for the Super Fragment Separator project**

- **The Super- Fragment - Separator(Super-FRS) project is an in-flight separator with a rigidity of up to 20 T.m.**

  The super fragment separator will separate a primary beam of elements within some hundred nanoseconds, thus very short-lived nuclei can be studied efficiently.

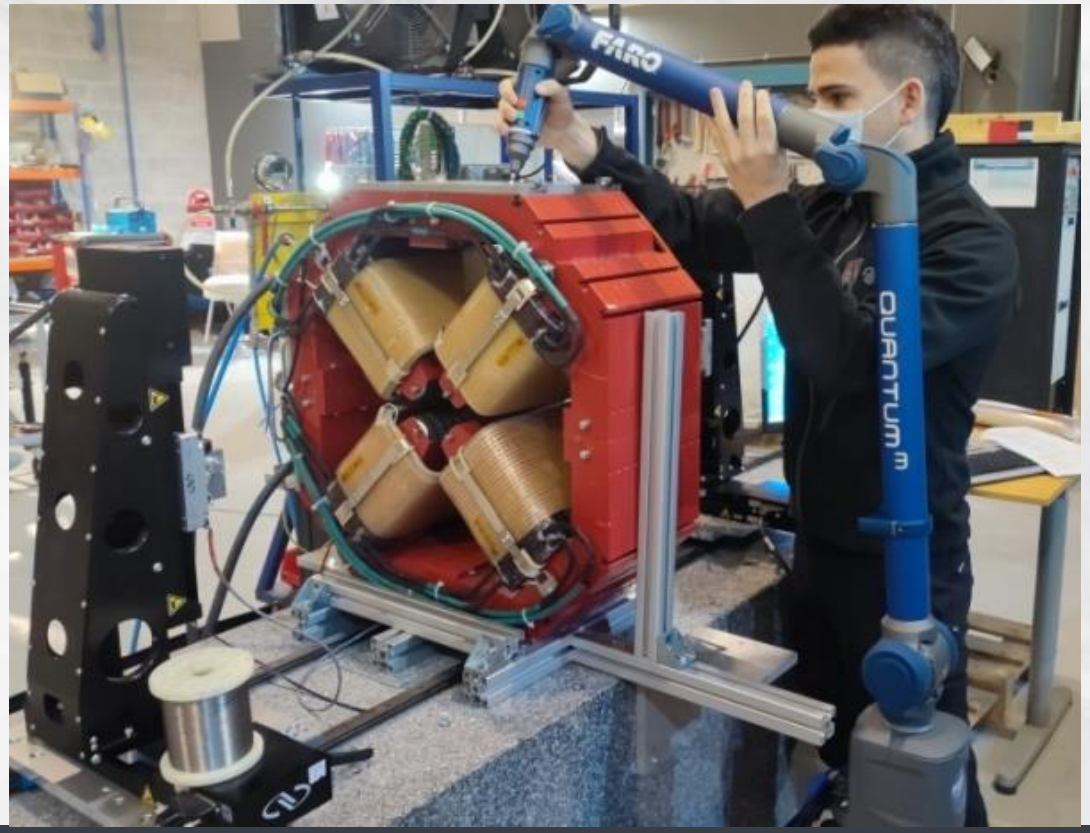
Dipole Magnets for the Super Fragment Separator project at FAIR

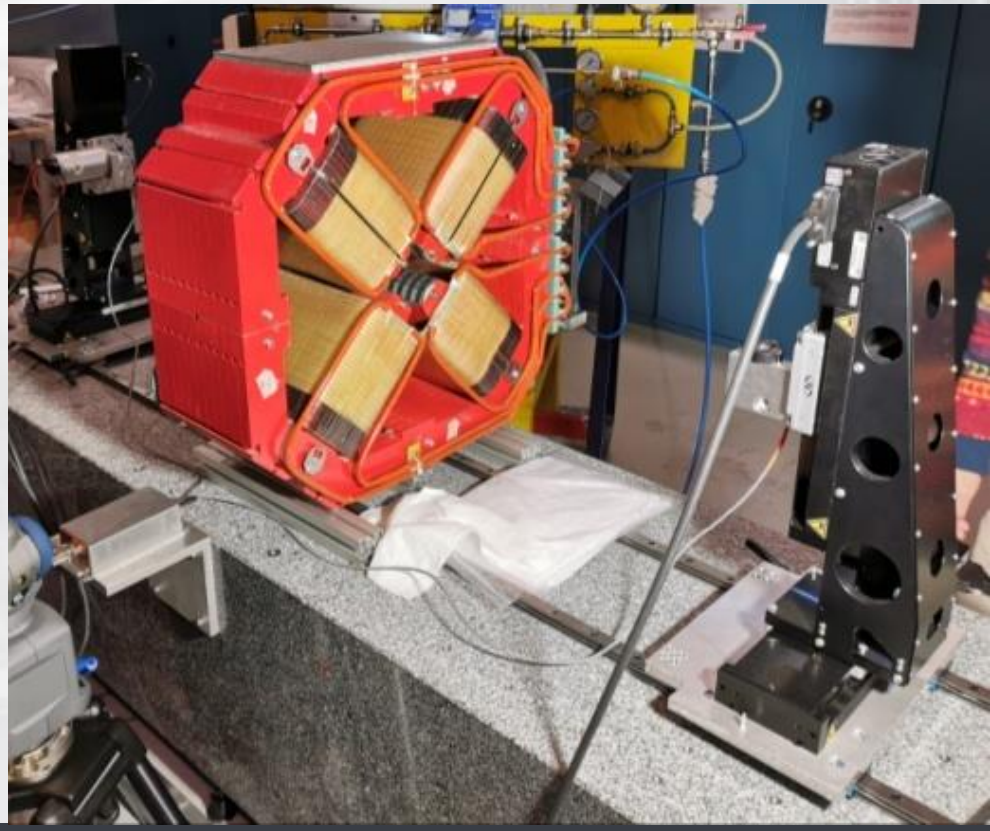
The order, worth over EUR 12 million, is for the construction of 21 superconducting superferric dipoles, to deviate the trajectory of the particles that pass through them. The dipole magnets of the separator will have a deflection radius of 12.5 m, a field up to 1.6 T, a gap of at least 170 mm and an effective length of more than 2 meters to bend ion beams with a rigidity from 2 T·m up to 20 T·m.



FEBE Hutch Magnets for STFC Daresbury Laboratory

- **The supplied consists Magnetic design, engineering design (mechanical, thermal and electrical), manufacture and assembly and magnetic measurement of quadrupole and corrector beamline FEBE Hutch Magnets.**

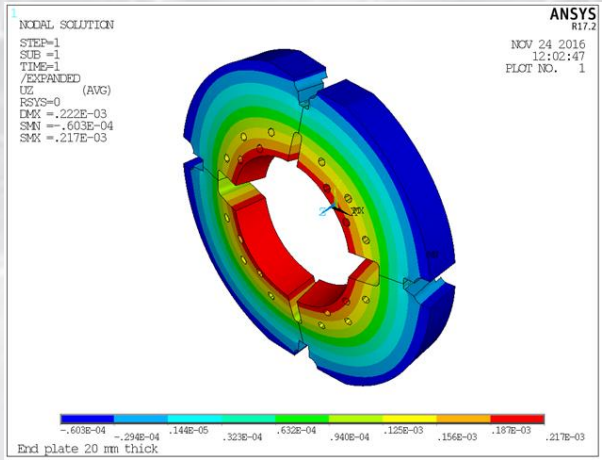


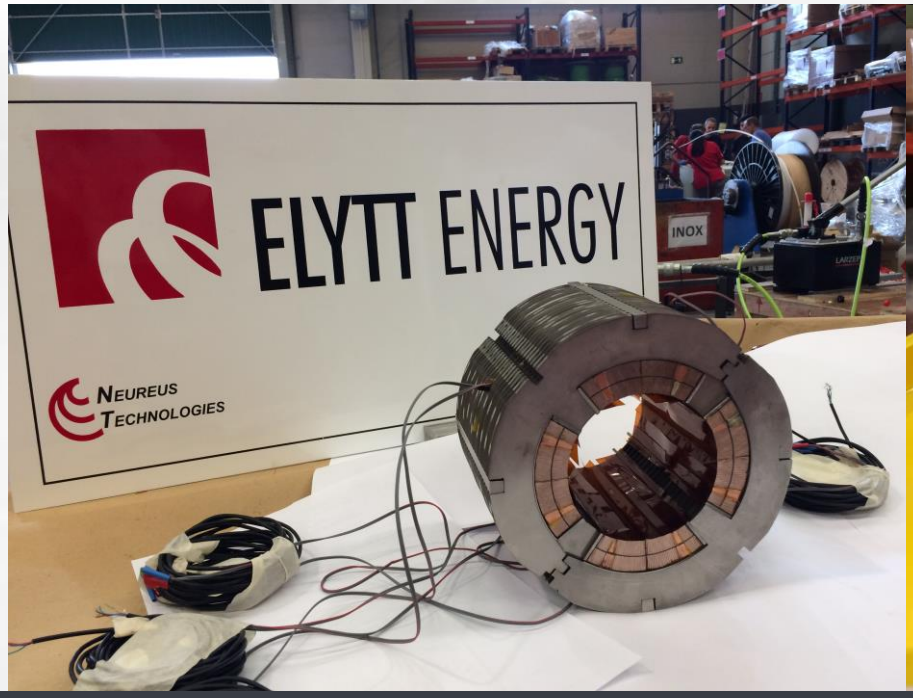


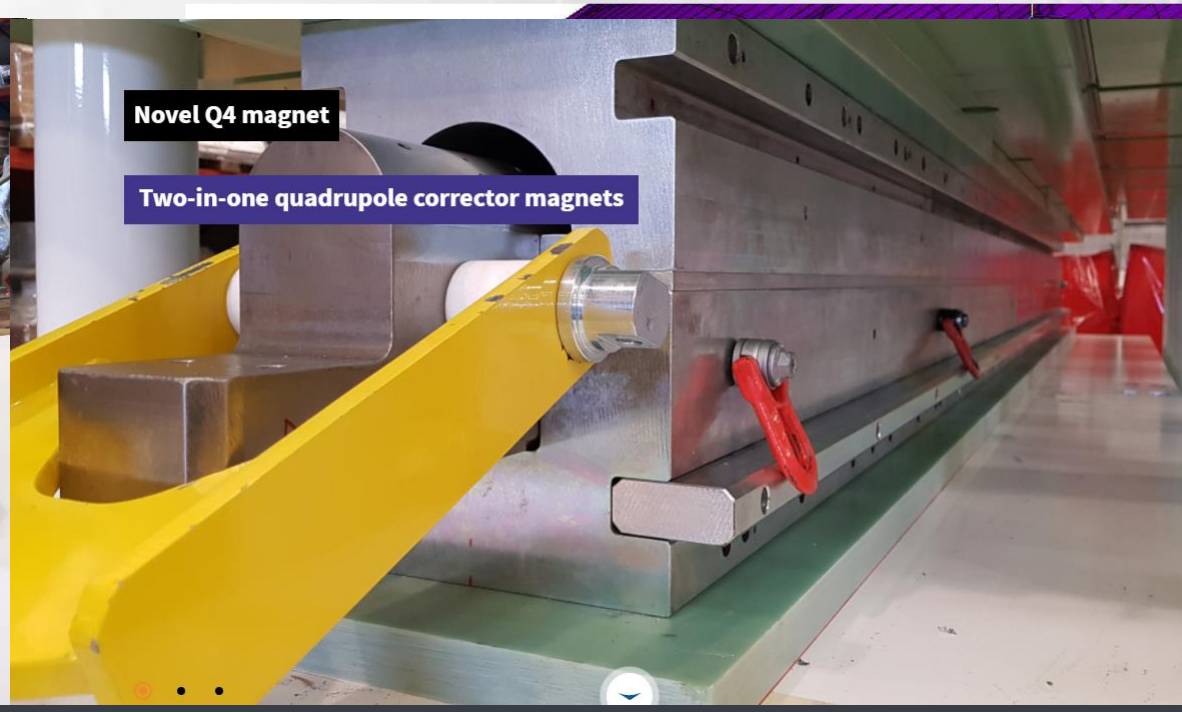
Reference Projects: QUACO

Tooling design

- The QUACO project, large apertures two-in-one quadrupoles magnets for the matching section; these quadrupoles should provide an integrated gradient of more the 400 T over an aperture of 90 mm, keeping the longitudinal length shorter than 4.5 m, requiring a peak field on the coil of the order of 6 T

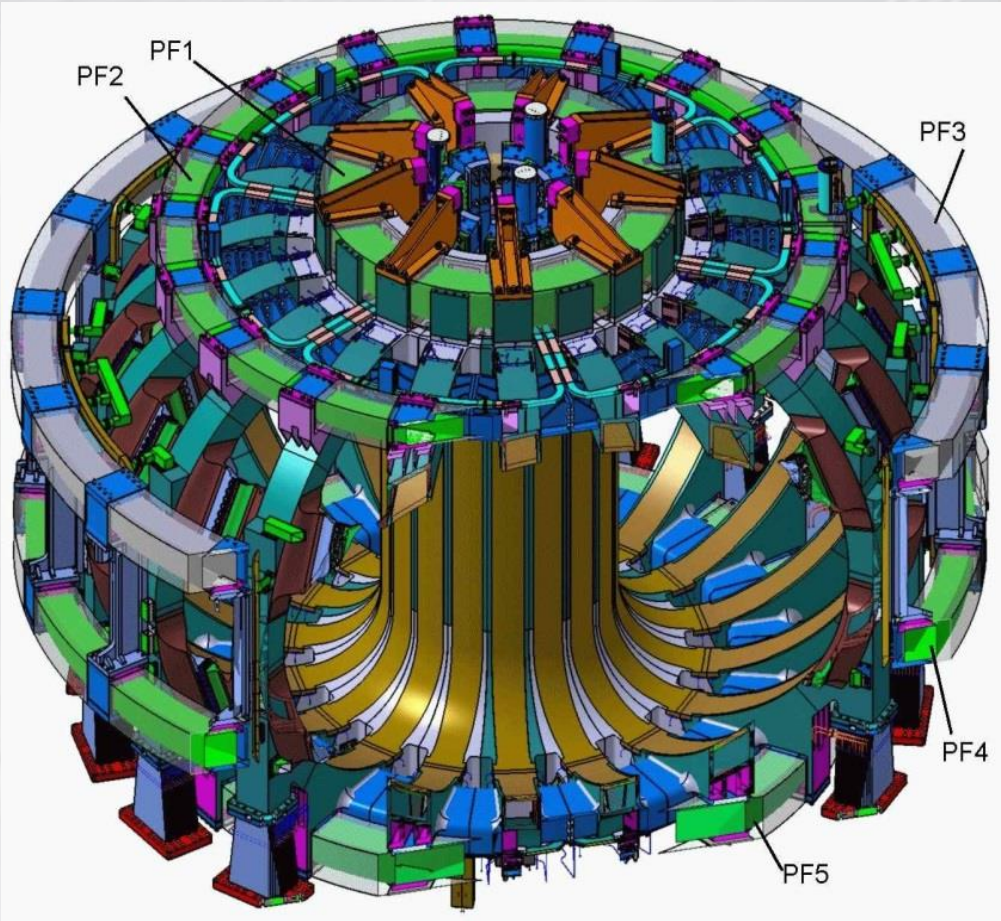






Reference Projects:

- **IMPREGNATION TOOLING AND ADDITIONAL TOOLING FOR ITER POLOIDAL FIELD COILS.**

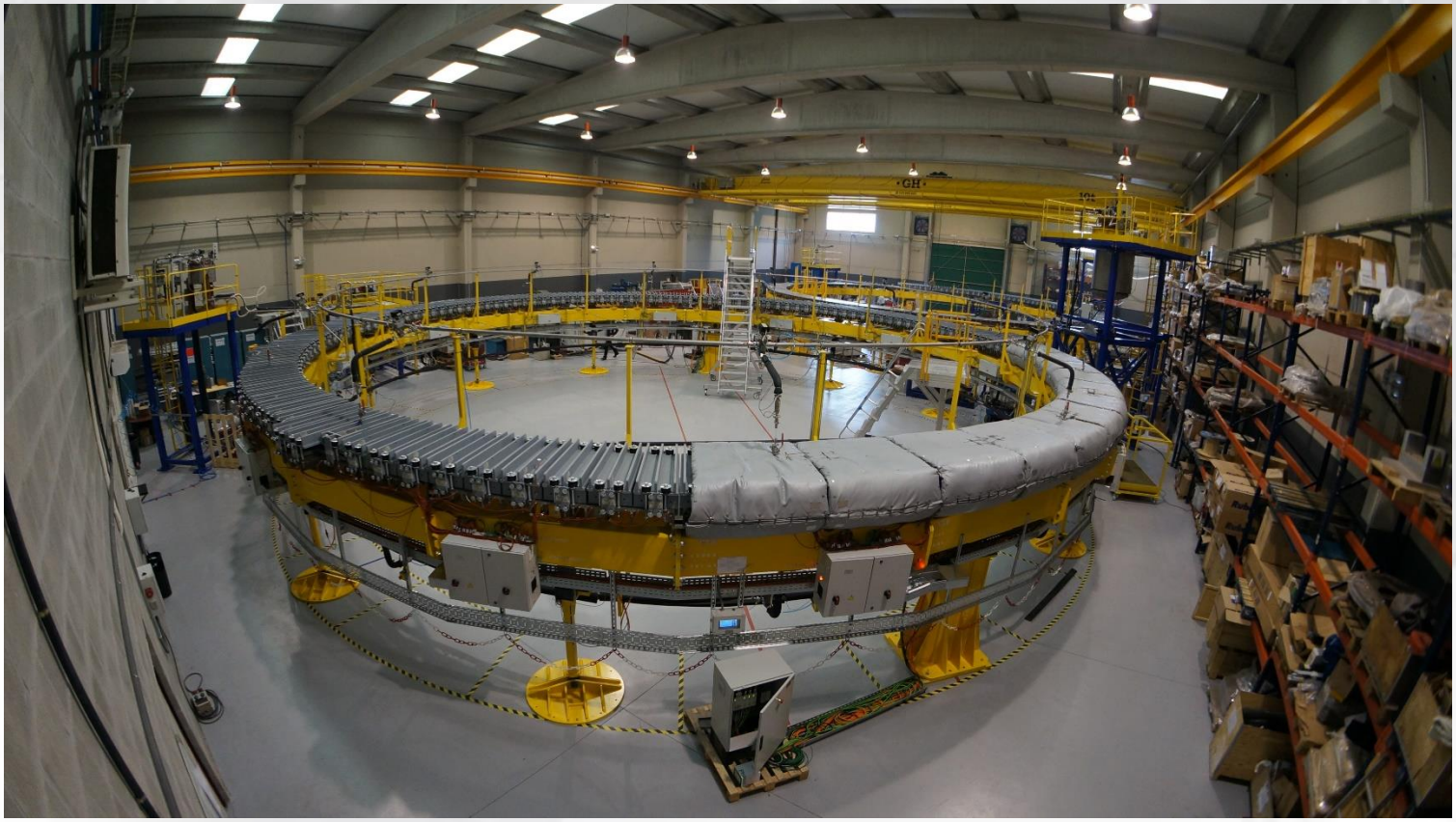


- **ELYTT leader of the consortium.**
- **PF Coil 25 meters ∅ & 400 *t***
- **8 years & 30 mill €**

Reference Projects:

- **IMPREGNATION TOOLING AND ADDITIONAL TOOLING FOR ITER POLOIDAL FIELD COILS.**

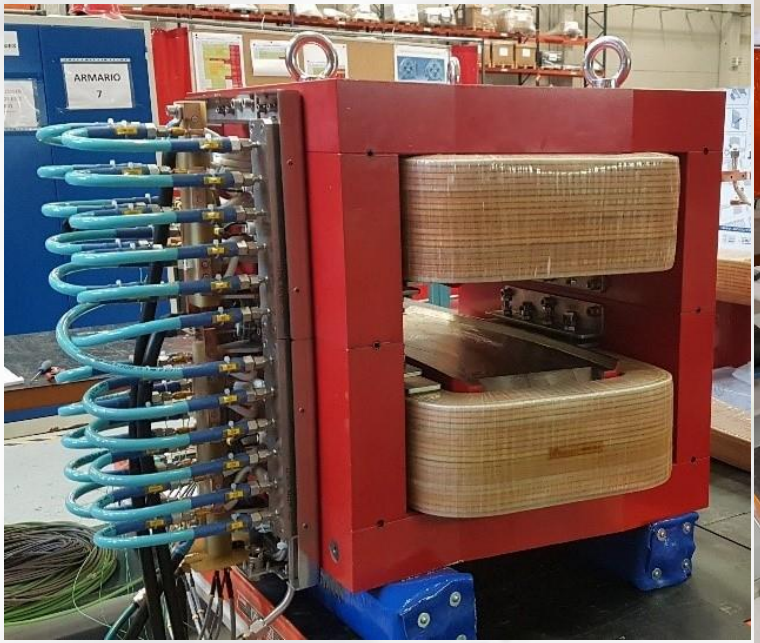
- Impregnation tooling
- Gantry crane 400 t
- Set of stations



Reference Projects:

- **Design and manufacture a dipole and quadrupoles for IFMIF project to CIEMAT**

Design and manufacturing a dipole and 8 Quadrupole magnets for the HEBT (High Energy Beam Transport) inside LIPAc (Linear IFMIF Prototype Accelerator) in the framework of IFMIF project (International Fusion Materials Irradiation Facility).

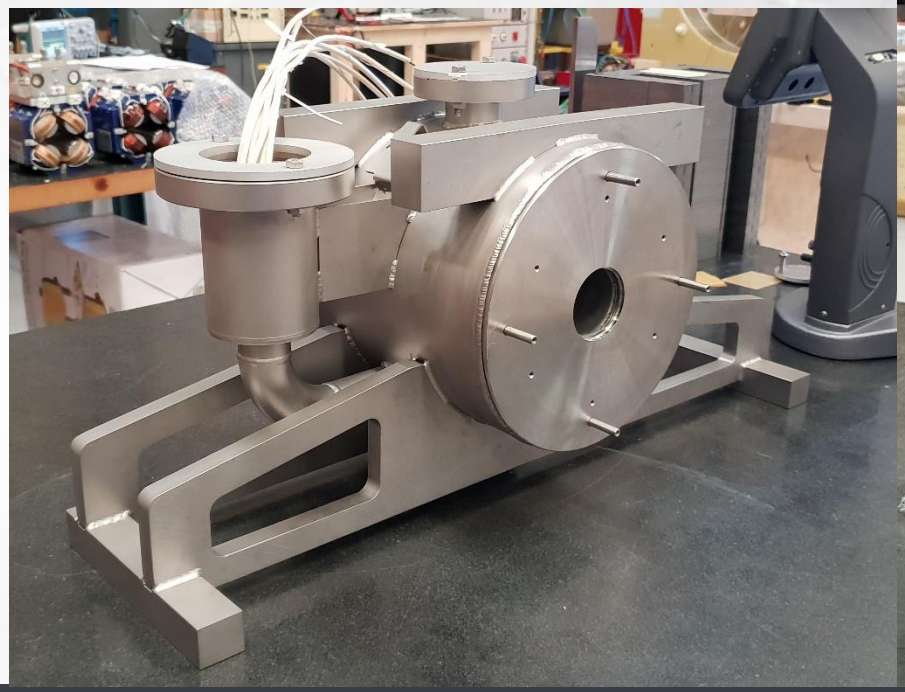


Reference Projects:

- **Design and manufacture 16 superconducting solenoid packages forCEA in SARAF project & supply 8 superconducting solenoid for CIEMAT in IFMIF LIPAC project**

CEA is committed to delivering a Superconducting Linac (SCL) for the SARAF accelerator. The 20.1m long Superconducting Linac (SCL) includes 20 identical Solenoid Packages (SP).

Each of the solenoid packages includes a main solenoid for beam focusing purposes with two active shielding solenoids, a pair beam steerers (horizontal and vertical) and a machined body for the installation of a Beam-Position Monitor (BPM).



Reference Projects:

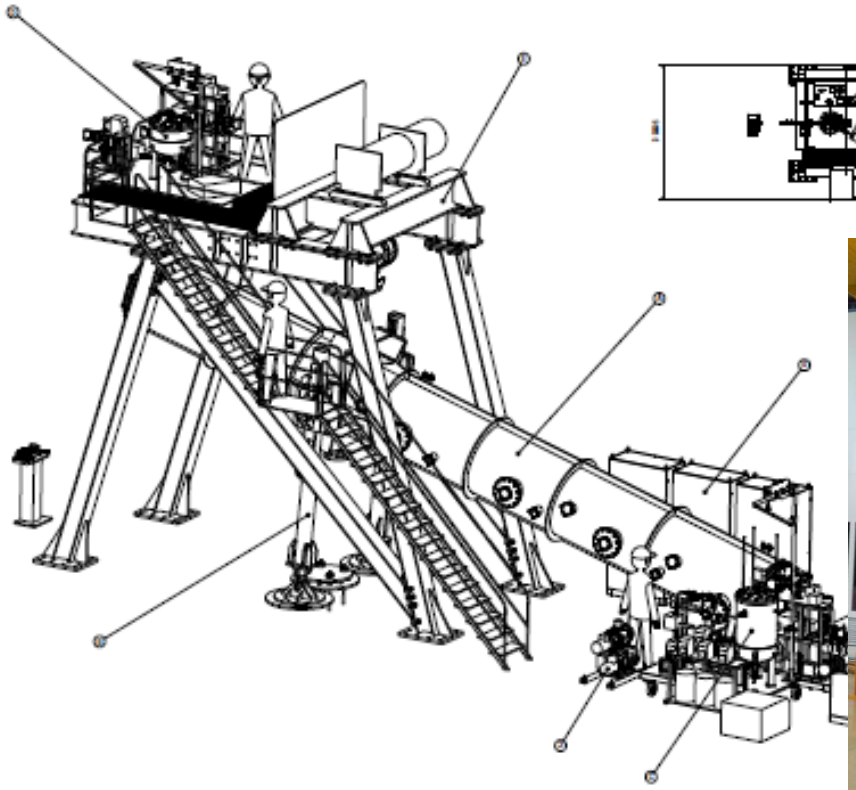
Manufacturing of 10 Superconducting coils for ITER/F4E:

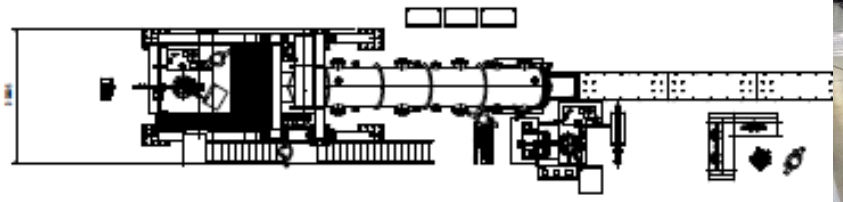
- ELYTT Energy is member of one international consortium, responsible for the manufacture of 10 Winding Packs for the Toroidal field coils

PROJECTS:

Supply of a Vacuum Impregnation System for CERN

- Design, engineering and manufacture of a VPI Station for the CERN prototipes for High Luminisity coils

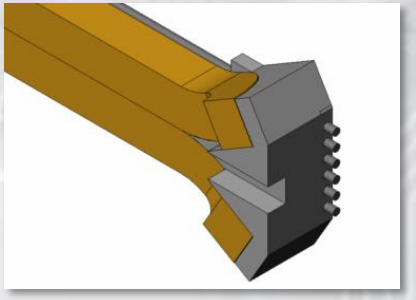


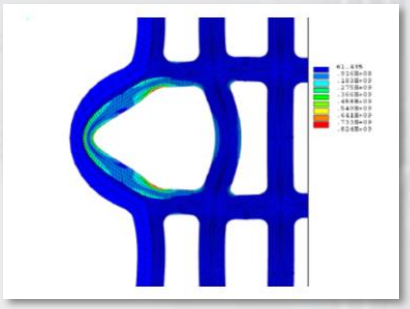


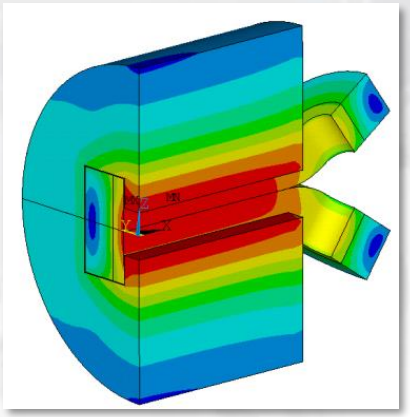
PROJECTS:

European Superconducting Dipole Design. EFDA/ITER:

- Work:
  - Non planar racetrack coil solution.
    - 2D magnetic-static analysis: field distribution, forces/length, energy/length unit.
    - 3D magnetic-static analysis: side effects, forces, energy.
    - 2D stress analysis: coil central plane stress (linear elastic analysis, material properties), conduct stress (local linear elastic analysis), shear in insulation.
    - 3D stress evaluation: using simplified models (beams), stresses in non planar coil region is confirmed.
  - Planar racetrack with CICC (cable in conduit) solution.
    - 2D magnetic-static analysis: field distribution, forces/length, energy/length unit.
    - 2D stress analysis: coil central plane stress (linear elastic analysis, material properties), conduct stress (local linear elastic analysis), shear in insulation.
    - Planar racetrack with Rutherford conductor.
    - 2D magnetic-static analysis: field distribution, forces/length, energy/length unit.
    - 2D stress analysis: coil central plane stress (linear elastic analysis, material properties), conduct stress (local linear elastic analysis), shear in insulation.



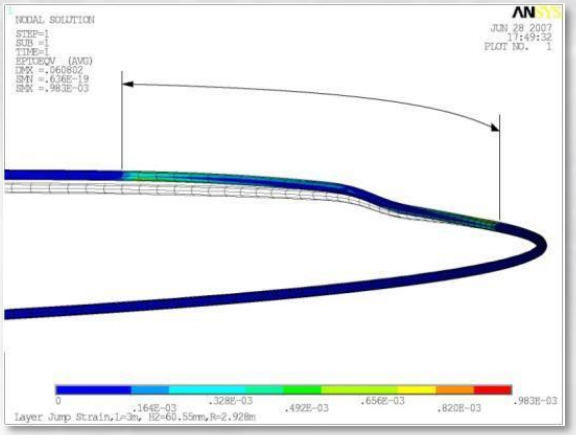


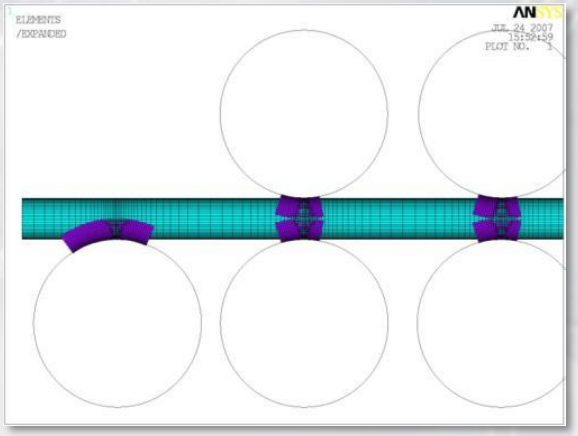


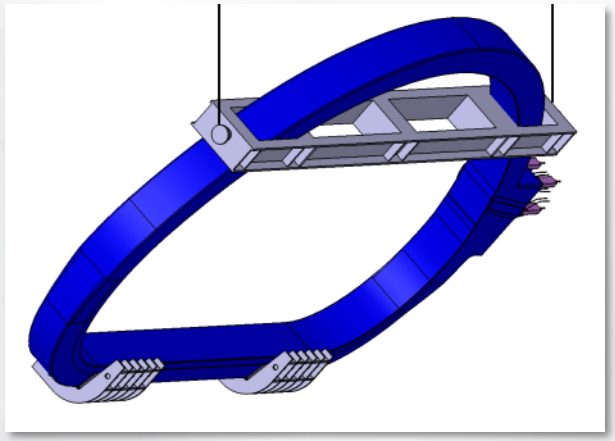
PROJECTS:

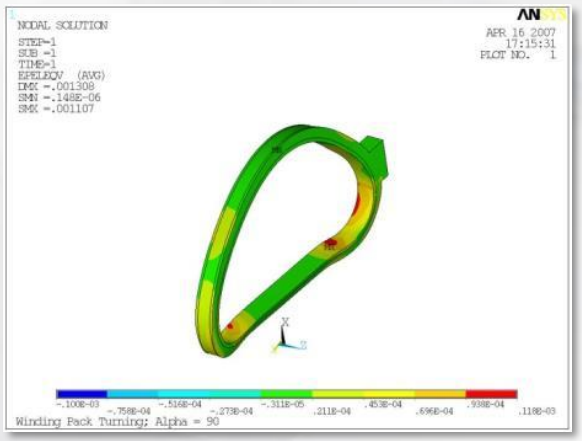
Mechanical engineering for ITER/EFDA:

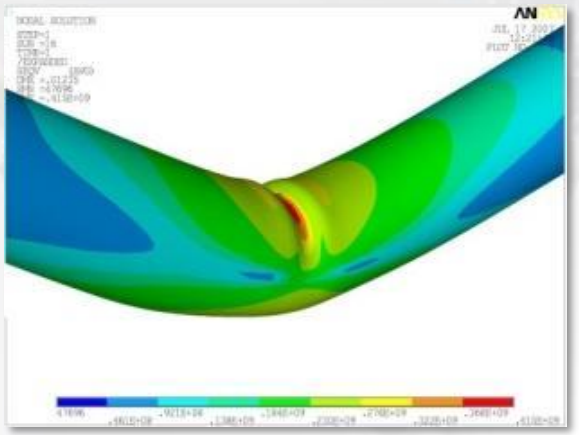
- ELYTT Work :
  - Manufacturing tools/ procedures design:
    - DP winding
    - Conductor Heat treatment
    - DP insertion in RP
    - DP insulation
    - WP insulation
    - WP Insertion in case.







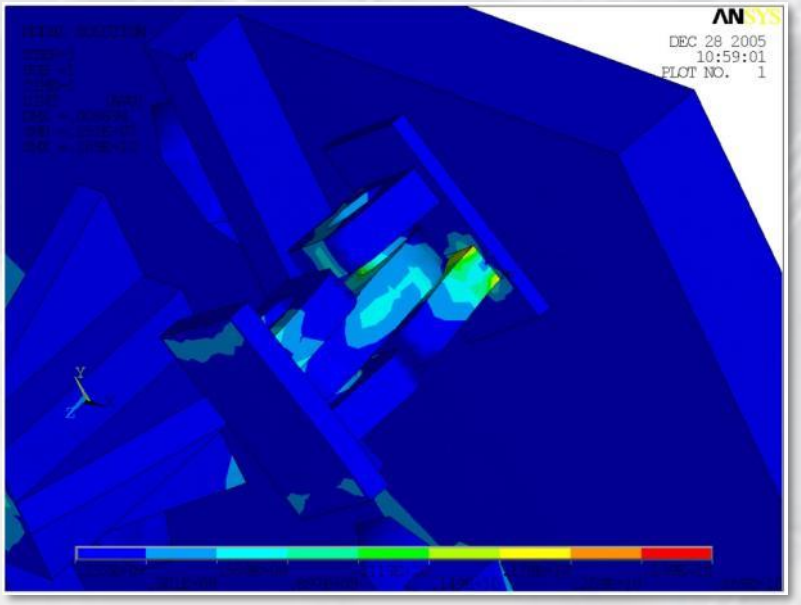


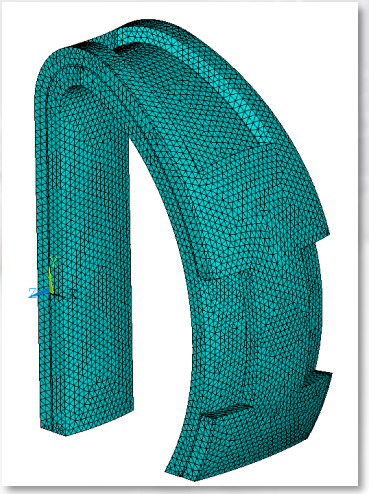


PROJECTS:

Blanket attachment design. EFDA/ITER:

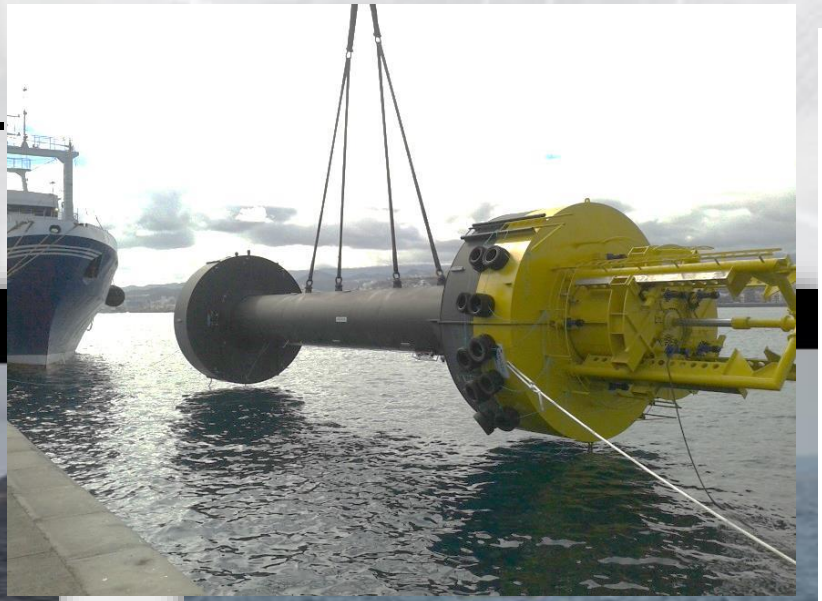
- Work:
  - Design of flexible attachments of blanket modules.
  - Analytical Design.
  - Simplified models using plates and bars.
  - Detailed 3D FEM model of the blanket module.
  - Detailed 3D FEM model of the complete structure (Hot rings and manifolds).
  - Coupling of both structures with 3D FEM sub-modelling.
  - All models done under mechanical, thermal and electromagnetic loads.

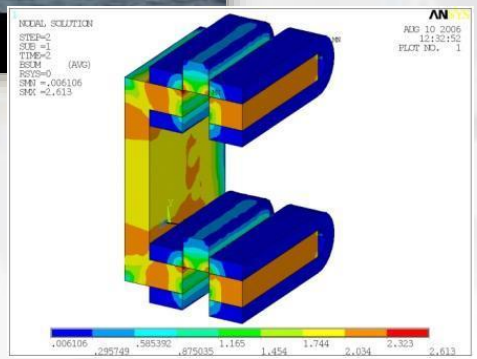




Reference Projects:

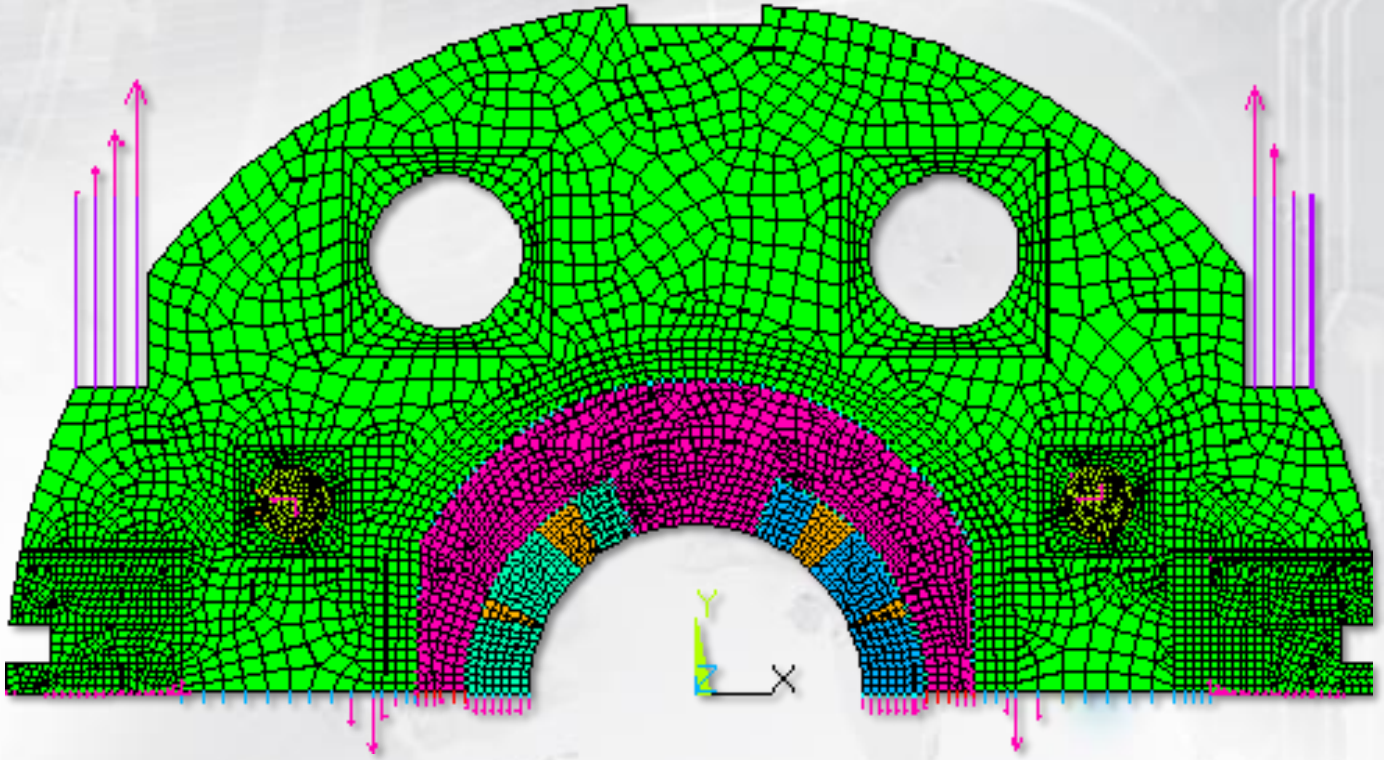
- **Wave energy direct generation.**





STAFF EXPERIENCE:

- **Design:**
  - D1_mechnical.gif presents the finite elements mechanical calculation of the separation recombination dipolo for the experimental insertions of the LHC. Mechanical calculations. The magnet behaves in a perfect way.



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