

List of In-Kind Contributions to ESS



Accelerator



Denmark

Aarhus University

- Beam Diagnostics (Cold Linac Wire Scanners)
- Beam delivery system with optics and rastering magnets



Estonia

Tallinn University of Technology

- High speed multi-channel MicroTCA.4 platform for fast BPM systems
- Design, development and evaluation of high voltage power converter module for Modulator



France

National Center for Scientific Research (CNRS)

- Spoke Linac Cryomodules
- Spoke Linac Cryogenic Distribution Line

French Alternative Energies and Atomic Energy Commission (CEA)

- Radio-Frequency Quadrupole (RFQ) section of the Normal Conducting Linac
- Elliptical Cryomodules for the Medium and High Beta Linac (components supply, engineering, assembly and technical assistance in installation and commissioning)
- Elliptical Linac H-ECCTD, High Beta Elliptical cavities and cryomodule demonstrator
- Neutron beam loss monitor
- Non-invasive profile monitor
- Emittance Measurement Unit and Beam Diagnostics (Doppler Shift Measurement) for the Low Energy Beam Transport (LEBT)



Hungary

Institute for Nuclear Research, Hungarian Academy of Sciences

- RF Local protection system



Italy

National Institute for Nuclear Physics (INFN)

- Ion Source and Low-Energy Beam Transport
- Medium Beta Elliptical Cavities, Fabrication and Testing
- Drift-Tube Linac with BPMs, BCMs
- Initial operations: 4 spare Medium Beta Cavities, fabrication and testing

Elettra Sincrotrone Trieste

- Spoke RF Power Stations – including installation, testing and commissioning
- Linac Magnets
- Power Converters for Linac Magnets
- Wire Scanner Acquisition



Norway

University of Bergen

- Ion source expert

University of Oslo

- Beam Diagnostics Imaging Systems



Poland

The Henryk Niewodni Institute of Nuclear Physics (IFJ PAN)

- Support work for installation, testing and commissioning
- Installation of Power Converter Systems and RF Systems
- Manpower for cryomodule tests in Lund
- Initial Operations: SRF and Cryogenics Support

Polska Grupa Energetyczna

- Low-level RF system units

Wroclaw University of Science and Technology (WUST)

- Cryogenic distribution line, elliptical linac and test stand
- Initial operations: Cryomodule support

The National Center for Nuclear Research

- Gamma Blockers

Technical University of Lodz

- Initial Operations: Software for superconducting cavities characterisation and the ESS Test Stand 2 Cryomodule Programme

Warsaw University of Technology

- Phase-Reference Line



Spain

ESS Bilbao Consortium

- Medium Energy Beam Transport (MEBT) section of the Normal Conducting Linac – including Installation, Testing, and Commissioning
- RF for Normal Conducting Linac
- Klystron Modulators for RFQ and DTL sections



Sweden

Lund University

- Support at LTH M Building
- Temperature Control of Phase Reference Line
- R&D on Optimal Design and Advanced Control of High Power Modulator
- APTM Grid Electronics
- Development of low level RF
- Addendum for the Power Converter to the Klystrons - oil tank
- Multi Level High Voltage Pulse Power Converters for Electrical Supply of Klystrons and IOTs

Uppsala University

- Initial Operations: FREIA lab facility 2021
- Prototype high power (353 MHz & 704 MHz) amplifier tests
- Tests of Spoke Cryomodule prototypes

University West

- Development of Luminescent Coating for High Power Target



United Kingdom

Science and Technology Facilities Council (STFC)

- High-beta elliptical cavities, fabrication and testing
- Linac Warm Units (LWU)
- RF Distribution System/Superconducting linac waveguides and directional couplers
- Preliminary Design Evaluation of the Target Imaging Optical System

Target



Czech Republic

Nuclear Physics Institute of the CAS

- Target Station HVAC
- Additional work for the Target Station HVAC
- Primary and Intermediate Water Cooling Systems
- Additional work for the Primary and Intermediate Water Cooling Systems
- Target Helium Cooling System



Denmark

Technical University of Denmark

- Tungsten Release Factors



Germany

Forschungszentrum Jülich

- Neutron Beam Extraction System (NBEX) including Feasibility Study
- Moderator & Reflector Plugs
- Fiducials for the Imaging System of the Moderator and Reflector Plugs
- Cryogenic Moderator System

- Target Monitoring Plug



Hungarian Academy of Sciences - Centre for Energy Research

- Manufacturing and Delivery of Casks, Hoists and EC&I for the Target Station
- Initial Operations: Continued Manufacturing and Delivery of Casks, Hoists and EC&I for the Target Station



National Research Council of Italy

- Irradiation Module



ESS Bilbao Consortium

- Tuning Beam Dump
- Proton Beam Window
- Proton Beam Instrumentation Plug
- Monolith Vessel
- Target Wheel



Science and Technology Facilities Council - UKAEA

- Active Cells Facility

ICS



Tallinn University of Technology

- Timing Systems Components
- FPGA IOC

- EPICS EtherCAT driver/slave development
- Cybersecurity assessment, development, training & Risk Assessment



French Alternative Energies and Atomic Energy Commission (CEA)

- Controls for Ion Source, LEBT and RFQ



Forschungszentrum Jülich

- Target Monitoring Plug Control System



National Institute for Nuclear Physics (INFN)

- DTL Control Systems



Institute for Energy Technology (IFE)

- Client software development for the integrated control system (Logbook and Alarms)
- Alarms Management
- Integrated Control System Network
- Main Control Room, Design and Implementation
- ICS Logbook management
- Server and Storage



Technical University of Lodz

- IPMI EPICS BLM & RTM Software and Firmware Development



ESS Bilbao Consortium

- Medium Energy Beam Transport (MEBT) integration



Uppsala University

- Control System for Spoke Cryomodule Testing, Lund Test Stand and Methodology and Procedures for Machine Physicists



ZHAW Zurich University of Applied Sciences

- Machine and Personnel Protection Core Components

Paul Scherrer Institute

- Digital Controller



Science and Technology Facilities Council (STFC)

- Detector Control Software

NSS



Nuclear Physics Institute of the CAS

- Instrument BEER Phase I-IV
- 60 kN Uniaxial Deformation Rig



University of Copenhagen

- Instrument BIFROST Phase I-IV
- Instrument MIRACLES - Phase I-IV

Roskilde University

- Peltier Based Temperature Controlled Sample Platforms

Technical University of Denmark (DTU)

- Instrument BIFROST Phase I-IV

Aarhus University

- Instrument HEIMDAL Phase I-IV



Estonia

Tallinn University of Technology

- Detector Electronics for the NMX Detector

University of Tartu

- Radiological Materials Glove Boxes for Neutron Scattering Experiments
- Workplan FLUCO SULF "Electrochemistry Cells for Neutron Measurements"
- Set-Up and follow-up for Laser-Neutron Pump-Probe Experiments
- Humidity chamber for neutron SANS measurements
- Workplan FLUCO #1 for two Gas Process Handling Systems (GPHS)
- Stopped flow Unit for neutron SANS measurements



France

Laboratoire Léon Brillouin

- High Pressure Sample Environment Systems
- VSANS ADD-ON
- Design, procurement, manufacturing and delivery of a 8T vertical magnet and low temperature inserts
- NMX Detector Positioning Robot, Preliminary Study
- MAGIC - Magnetic Single Crystal Diffractometer - Instrument Concept
- Instrument MAGIC - Phase I-IV
- Instrument DREAM - Phase I-IV
- Instrument C-SPEC - Phase I-IV
- Instrument BIFROST Phase I-IV
- Instrument SKADI - Phase I-IV



Germany

Helmholtz-Zentrum Geesthacht

- Am-CLD demonstrator detector
- Instrument BEER - Phase I-IV

Technical University of Munich

- Instrument C-SPEC - Phase I-IV
- Instrument ODIN - Phase I-IV

Forschungszentrum Jülich

- Development and Prototyping of the Detector for the DREAM instrument
- Test Package for Linear Motion Technology
- Secondment of a Scientist
- Data Analysis & Modelling
- Standardised high speed choppers
- Robotics Sample Changer Platform
- Choppers control system integration
- Instrument MAGIC - Phase I-IV
- Instrument SKADI - Phase I-IV
- Instrument T-REX - Phase I-IV
- Instrument DREAM - Phase I-IV



Hungary

Hungarian Academy of Sciences - Centre for Energy Research

- Optimisation of signal to background ratio for neutron detectors
- Detector Simulation Effort
- NMX Shielding System
- Optics for NMX

Wigner Research Centre for Physics

- Training of Motion Control Engineer
- Secondment of a Mechanical Engineer for NMX
- Secondment of an Instrument Scientist for NMX
- NMX Chopper system

- NMX Neutron Optics Engineering Design
- NMX Control System Architecture Study
- Miracles at ESS: Optimisations of the back-end of the backscattering instrument
- Instrument BIFROST Phase I



National Research Council of Italy

- OPUS USANS
- CERAMIX4ESS
- GEM Detectors
- CEMENT4ESS
- Instrument T-REX - Phase I-IV
- Instrument VESPA - Phase I-IV



Institute for Energy Technology (IFE)

- Test experiments with neutron instruments at the JEEP II reactor and contribution to the ESS Test Beamline team
- Instrument BIFROST Phase I-IV
- Instrument HEIMDAL Phase I-IV

University of Bergen

- DEMAX - Macromolecular Crystallisation



ESS Bilbao Consortium

- Training of Motion Control Engineer
- Secondment of a mechanical engineer to LOKI
- Beam Transport Optimisation for Extreme Condition Diffractometer
- Instrument MIRACLES - Phase I-IV



Uppsala University

- Initial Operations: Use of Mikrohallen - Source Testing Facility

Lund University

Initial Operations:

- NMX Scientist Secondments
- ODIN Commissioning Scientist



Switzerland

Paul Scherrer Institute

- Experimental Control Software
- Data Curation (Adara - Data Cataloguing)
- Data Analysis & Modelling Software for Imaging
- Instrument MAGIC - Phase I-IV
- Instrument ODIN - Phase I-IV
- Instrument HEIMDAL Phase I-IV
- Instrument ESTIA - Phase I-IV
- Instrument BIFROST Phase I-IV



United Kingdom

Science and Technology Facilities Council (STFC)

- User Labs
- Data Streaming Infrastructure
- Data Reduction and Experiment Control Framework Development
- Detector Readout
- Instrument VESPA - Phase I-IV
- Instrument FREIA - Phase I-IV
- Instrument LOKI - Phase I-IV
- LOKI Detector Upgrade

Science



Denmark

Technical University of Denmark (DTU)

- Initial Operations: Secondment - Instrument simulations and integration testing

Sweden



Lund University

Initial Operations:

- Polarisation (0-6 Months)
- Deuterium Laboratory Services (DLS)