No. 27663

UNITED KINGDOM OF GREAT BRITAIN AND NORTHERN IRELAND
and
ITALY

Agreement concerning collaboration in the exploitation of the spallation neutron source ISIS for condensed matter research (with annex). Signed at London on 9 October 1989

Authentic texts: English and Italian.

Registered by the United Kingdom of Great Britain and Northern Ireland on 23 November 1990.

ROYAUME-UNI DE GRANDE-BRETAGNE ET D'IRLANDE DU NORD
et
ITALIE

Accord relatif à la collaboration pour l'exploitation de l'installation ISIS de production de faisceaux neutroniques de spallation pour la recherche sur la matière condensée (avec annexe). Signé à Londres le 9 octobre 1989

Textes authentiques : anglais et italien.

Enregistré par le Royaume-Uni de Grande-Bretagne et d'Irlande du Nord le 23 novembre 1990.

AGREEMENT[1] BETWEEN THE GOVERNMENT OF THE UNITED KINGDOM OF GREAT BRITAIN AND NORTHERN IRELAND AND THE GOVERNMENT OF THE ITALIAN REPUBLIC CONCERNING COLLABORATION IN THE EXPLOITATION OF THE SPALLATION NEUTRON SOURCE ISIS FOR CONDENSED MATTER RESEARCH

The Government of the United Kingdom of Great Britain and Northern Ireland and the Government of the Italian Republic,

Desiring to encourage greater fruitful scientific collaboration between their countries;

Recognising in particular the importance of neutron spectroscopy and diffraction for condensed matter research;

Aware that the spallation neutron source ISIS at the Science and Engineering Research Council's Rutherford Appleton Laboratory, Chilton, UK, represents the most advanced pulsed neutron facility in the world, offering unique opportunities for condensed matter research using neutron and muon beams;

Considering the progress towards international collaboration in the utilisation of the facility following the Memorandum of Understanding signed in 1985 ;

Desiring to enable scientists from their countries to secure future access to the facility;

Recognising the benefits which will accrue from international collaboration in the exploitation of the facility;

Have agreed as follows:

ARTICLE 1

The Agreement concerns collaboration in the exploitation of the spallation neutron source ISIS; a technical description of the facility is given in the Annex to this Agreement.

ARTICLE 2

The object of the Agreement is to enable scientists from Italy to secure access to ISIS for the purpose of carrying out research into the properties of condensed matter using neutron and muon beams.

ARTICLE 3

The parties to the Agreement shall use their best endeavours to maintain the pre-eminence of the facility and to develop new methods for neutron beam research, thus enhancing the quality of the research programme. They shall encourage the study and development of other techniques which may be achievable with ISIS, including utilisation and development of the muon facility.

[1] Came into force on 9 October 1989 by signature, in accordance with article 7.

ARTICLE 4

Italian scientists may be represented on appropriate ISIS committees, in particular the ISIS Science Advisory Committee, which considers scientific and technical matters bearing on the exploitation of the facility, including the assessment of experiment proposals and the allocation of instrument time.

ARTICLE 5

The Science and Engineering Research Council and the appropriate Italian agency or agencies shall conclude separate agreements establishing the procedures of collaboration which shall include appropriate financial contributions to be paid. The Science and Engineering Research Council and the Consiglio Nazionale delle Ricerche may agree to collaborate in the context of the Agreement, concerning neutron scattering using the spallation neutron source, signed on 29 November 1985, augmented as necessary.

ARTICLE 6

The Agreement is open to accession by third parties.

ARTICLE 7

The present Agreement shall enter into force upon signature and shall continue in force until 31 December 1992. The Agreement shall be reviewed in 1991, when extension shall be considered.

In witness whereof the undersigned duly authorised thereto by their respective Governments, have signed this Agreement.

Done in duplicate at London this 9th day of October 1989 in the English and Italian languages, both texts being equally authoritative.

For the Government
of the United Kingdom of Great Britain
and Northern Ireland:

FRANCIS MAUDE

For the Government
of the Italian Republic:

BORIS BIANCHERI

ANNEX

Outline description of facilities available to users at ISIS

INTRODUCTION

(1) ISIS is a pulsed spallation facility providing neutron beams (and also muon beams) for condensed matter research, located at the Rutherford Appleton Laboratory of the UK Science and Engineering Research Council in Oxfordshire, England.

(2) The facility consists of a high-intensity proton accelerator feeding a neutron production target station, and a set of neutron-scattering instruments and associated equipment. The proton beam also serves, independently, a muon beam facility.

ACCELERATOR

(3) The accelerator system comprises a linac injector coupled to a rapid-cycling proton synchrotron. The design parameters are as follows:

Proton injection energy	70 MeV
Final proton energy	800 MeV
Proton pulse length	0·4 microseconds
Pulse frequency	50 Hz
Proton intensity	$2{\cdot}5\ 10^{13}$ protons per pulse

These design parameters correspond to a proton current of 200 microamperes.

(4) In the immediate future it is intended to operate at approximately 100 microamperes mean proton current, while increasing the reliability of the accelerator system to greater than 90%. Subsequently the proton current will be increased to its maximum operating level.

(5) The present proton energy is 750 MeV; after a period of operation it is expected to be raised to 800 MeV.

TARGET STATION

(6) The target station comprises a uranium-238 target assembly; a multi-moderator and reflector system; a massive bulk radiation shield; neutron beam ports with appropriate collimating elements and beam shutters.

(7) There are four neutron moderator systems, viz

300K H_2O
300K H_2O
100K CH_4
20K H_2

(8) The bulk shield, together with the beam port collimation and shutters, ensures that clean beams are provided with low extraneous radiation levels in the experimental area.

INSTRUMENTATION

(9) The neutron-scattering instruments are arranged around the target station in a large experimental hall.

(10) There are presently ten neutron instruments fully scheduled for the user programme. There is one instrument under development, and two instruments in the course of construction or commissioning. In addition there is the muon facility.

(11) The present thirteen neutron instruments are as follows:

Instrument		*Moderator*	*Status*	*Scientific applications*
Critical reflection spectrometer	CRISP	H_2	Scheduled	Surface structure, interfaces and surface magnetism.
Electron volt spectrometer	eVS	H_2O	Development	Electronic energy levels. Crystal field excitations. Single particle motion in quantum systems.
High energy transfer spectrometer	HET	H_2O	Scheduled	Magnetic and vibrational excitations. Brillouin scattering. Single particle motion in quantum systems.
High resolution powder diffractometer	HRPD	CH_4	Scheduled	Large unit cell structure determination. Phase transitions. Line broadening effects.
High resolution quasielastic and inelastic scattering spectrometer	IRIS	H_2	Scheduled	Rotational and translational diffusive motion in molecular systems. Quantum tunnelling.
Liquids and amorphous materials diffractometer	LAD	CH_4	Scheduled	Structures of liquids and amorphous solids. Crystal solids.
Small angle scattering instrument	LOQ	H_2	Scheduled	Biological, macromolecular and other large scale structures.
Multi angle rotor-instrument	MARI	CH_4	Construction	Excitations in crystalline and amorphous systems, magnetic and molecular spectroscopy.
Polarised neutron spectrometer	POLARIS	H_2O	Scheduled	Magnetic structures.

Instrument		*Moderator*	*Status*	*Scientific applications*
Coherent collective excitations spectrometer	PRISMA	CH_4	Scheduled	Phonon and magnon collective excitations in single crystals.
Small angle neutron diffractometer for amorphous and liquid samples	SANDALS	CH_4	Construction	Structure factors of fluids, amorphous materials and biological systems.
Single crystal diffractometer	SXD	H_2O	Scheduled	Single crystal structure determination.
Time focused crystal analyser spectrometer	TFXA	H_2O	Scheduled	Molecular spectroscopy. Surface science.

(12) The muon facility is equipped for MSR research using transverse, longitudinal and zero-field measurements. Both positive and negative muon beams can be provided.

(13) A comprehensive system for data acquisition and reduction is provided for all instruments. It provides the experimenter with the following facilities:

(a) the ability to initiate and control the course of a run or sequence of runs. This includes recording data from any systems controlling the sample environment;

(b) a graphical display of current data with the provision of normalisation and background subtraction;

(c) the ability to preserve copies of observed data and maintain catalogues of both raw and partially analysed data. These catalogues are arranged so that a user may interrogate them interactively;

(d) the ability to merge a number of data-sets into a composite run;

(e) provision for the manipulation and graphical presentation of data in a more interpretable form. For example, the observed intensities as a function of time and angle may be simply transformed to a scattering function dependent on momentum and energy transfer;

(f) provision of reduced and raw data on a transfer medium compatible with the experimenter's home computer.

A computing centre is provided in the experimental hall containing graphics terminals, printer, hard-copy graph plotter etc. A second workstation is also provided in a nearby office building.