

# RISING

## Rare Isotope Spectroscopic INvestigations at GSI

### Memorandum of Understanding

#### 1. *Introduction and purpose*

This memorandum of understanding is made between the parties constituting the RISING collaboration. Participating parties are individual institutions, research groups or funding agencies. The collaborating parties and signatories to this memorandum are listed in annex A.

The purpose of this memorandum is to establish collaboration between the parties in planning, developing, funding, constructing, operating and maintaining the RISING project at GSI for nuclear structure research with rare heavy ions as described in the document *Gamma-Spectroscopy with RISING at the FRS* (Annex B). This memorandum is not legally binding.

#### 2. *Provision*

##### 2.1 **Equipment**

For the duration of the agreement, the participants agree to be responsible for the following equipment.

- a) Euroball Cluster detectors and associated equipment (see Annex C) are provided by the participating institutions who are owners of the Euroball resource.
- b) BaF<sub>2</sub>  $\gamma$  detectors from the Hector array and associated electronics are provided by INFN Milano.
- c) Particle tracking and identification detectors are provided by GSI.
- d) FRS is provided by GSI
- e) Electronics and Data Acquisition. The necessary electronics and data acquisition system is provided by the collaboration. The host laboratory should ensure that adequate diagnostic tools (e.g. oscilloscopes) are available.
- f) Detector mechanics and cooling system. The holding structures are provided by the collaboration. GSI is providing the cooling system.

##### 2.2 **Running costs and maintenance**

The host laboratory will provide the accelerated ion beams, maintenance of the FRS, liquid nitrogen, as well as providing the required electrical and cooling water services. Repairs of Cluster detectors will be carried out locally wherever possible. The collaboration is jointly responsible for the cost of repairs, some of which have to be carried out by the manufacturer, and for the replacement of particle tracking detectors (e.g. Si detectors). In addition running costs for consumables and other necessary items will be shared between the collaborators.

### 2.3 **Installation, Commissioning and Maintenance**

The participating institutes will provide effort to help install and commission the  $\gamma$  detectors, associated instrumentation, electronics and data acquisition. The collaboration is jointly responsible for the costs of moving equipment.

### 2.4 **Travel**

Participants to the project are eligible to apply for travel money from EU LSF funds or funds from other EU programs which may become available in the future. These funds cover only part of the expected costs. The collaborating institutions are responsible for their own remaining travel and subsistence expenses.

Details of funds required including running costs and allocation of funds between participants are described in an addendum.

## 3. *MoU terms*

The project will be supervised by an International Steering Committee representing the collaboration. This Committee will coordinate the policy of the collaboration and will ensure that the entrusted equipment is optimally employed in experimental campaigns with a view to gaining maximum scientific advantage at all times.

RISING is an open collaboration. The Steering Committee is responsible for the admission of new collaborating parties.

This memorandum takes effect from August 1 and will be in force for four years. Continuation beyond this time takes place automatically on a bi-annual basis if none of the parties wish to alter any of the terms. Otherwise, it will be subject of negotiations.

Negotiations to alter any of the terms or to produce a specific agreement may start at any time on mutual understanding.

## **Annex A**

### **List of institutions collaborating in RISING**

HMI Berlin, Germany	Univ. Liverpool, UK
Univ. Brighton, UK	Univ. Lund, Sweden
Univ. Bonn, Germany	Univ. Manchester, UK
GANIL, Caen, France	INFN/Univ. Milano, Italy
INFN/Univ. Camerino, Italy	LMU München, Germany
NBI Copenhagen, Danmark	TU München, Germany
IFJ Cracow, Poland	INFN/Univ. Napoli, Italy
Univ. Cracow, Poland	CSNSM Orsay, France
CLRC Daresbury, UK	IPN Orsay, France
GSI Darmstadt, Germany	INFN/Univ. Padova, Italy
TU Darmstadt, Germany	Univ. Paisley, UK
Univ. Demokritos, Greece	FZ Rossendorf, Germany
INFN/Univ. Firenze, Italy	CEA Saclay, France
INFN Genova, Italy	KTH Stockholm, Sweden
MPI Heidelberg, Germany	IRES, Strasbourg, France
FZ Jülich, Germany	Univ. Surrey, UK
Univ. Keele, UK	IPJ Swierk, Poland
Univ. Köln, Germany	Univ. Warsaw, Poland
INFN Legnaro, Italy	Univ. Uppsala, Sweden
Univ. Leuven, Belgium	Univ. York, UK

## **Signatories**

**Prof. Dr. Gerda Neyens**

*for KU Leuven, Belgium*

**Prof. Dr. Jan Jolie**

*on behalf of the German institutions:  
Universities Berlin, Bonn, Darmstadt, Heidelberg,  
Köln, München, FZ Rossendorf and FZ Jülich*

**Prof. Dr. Jan Styczen**

*On behalf of the Polish institutions:  
The Niewodniczanski Institute of Nucl. Phys.  
(IFJ, Cracow), Inst. of Phys. Jagiellonian  
Univ. (Cracow), Institute of Exp. Phys. and  
Heavy Ion Lab. of Warsaw Univ., Soltan  
Inst. of Nucl. Studies (IPJ, Warsaw)*

**Prof. Dr. Claes Fahlander**

*on behalf of the Swedish institutions:  
Universities Lund, Uppsala  
and KTH Stockholm*

**Prof. Dr. Paul Nolan**

*on behalf of the UK institutions:  
Universities of Brighton, Keele, Liverpool,  
Manchester, Paisley, Surrey and York  
and CLRC Daresbury Laboratory*

**Dr. Jürgen Gerl**

*for Gesellschaft für Schwerionenforschung  
GSI mbH, Darmstadt, Germany*

## **Signatories**

**Prof. Dr. Gudrun Hagemann**  
*for NBI Copenhagen, Denmark*

**Prof. Dr. E. Iarocci**  
*For INFN, Italy*

## **Annex B**

### **Gamma-Spectroscopy with RISING at the FRS (Letter of Intent)**

## **Annex C**

### **List of items from Euroball provided for RISING**

#### **Detectors**

- 17 Cluster detectors and 1 spare cryostat
- 105 HV elbows
- full records of assembling, test and repair of Cluster detectors
- 1 manipulator (produced at GSI)
- 1 manipulator (produced at Legnaro)
- 1 crane
- 3 elevators
- all equipment needed for mounting and dismounting (except standard tools)

#### **Electronics**

- 17 Cluster cards and all spare cards
- 3 VXI crates
- 4 STR8080 DT32
- 3 Resource manager
- 1 Master trigger unit
- 1 VME crate
- 2 D2VB unit
- 1 HV CAEN crate with 16 cards, each card for 16 channels
- Cluster power supply
- 1 complete UPS unit

#### **Maintenance equipment**

- Complete GSI pump unit
- Annealing oven with pump
- All spare parts and equipment for Cluster detectors
- 2 Ortec power supplies for Cluster detectors
- 1 HV Caen crate with 2 cards
- 3 trollies for Cluster detectors

## Addendum to the RISING MoU

### RISING Costing (in kEUR)

Item	fast beam 1		fast beam 2		stopped beam		slowed-down	
Ge-holding structure	110	UK,I	-		110	UK,D		
Hector holding structure	20	I	-		-			
magnet (g-factor)	-		-		120	B	-	
plunger	-		-		-		40	D
deflection magnet	-		-		-		300	GSI
digital-electronics	-		350	D,UK,I,S	-		-	
GREAT-2	-		-		450	UK	-	
LN2-filling system	90	GSI	-		-		-	
tracking detector	80	GSI	-		35	GSI	35	GSI
S4-beamline	70	GSI	20	GSI	30	GSI	30	GSI
racks, cooling,cables	70	GSI	10	GSI	10	GSI	10	GSI
electronics, data acquisition	60	GSI	-		40	GSI		
maintenance laboratory	100	GSI	-		-			
<b>Total cost</b>	<b>600</b>		<b>380</b>		<b>795</b>		<b>415</b>	

The counties indicated in the table are those that have the technical responsibility and/or those that will bid for the funding of the particular item. If a given item is not fully financed then the cost will be shared by the partners.



**Running costs (in kEUR)**

<b>Covered by GSI</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>
LN2, power etc.	20	25	25	25
Computer maintenance	20	20	20	20
<b>sum</b>	<b>40</b>	<b>45</b>	<b>45</b>	<b>45</b>
<b>Covered by RISING collaborators</b>				
Ge-det. repair and replacement	50	60	60	60
Part.-det. repair and replacement	30	30	30	30
Electronics repair	30	30	30	30
Infrastructure items and shipping	35	20	20	20
Engineer travel	15	10	10	10
Contingency	30	20	20	20
<b>sum</b>	<b>190</b>	<b>170</b>	<b>170</b>	<b>170</b>

**Countries will bid for the running costs in the following proportion**

<b>B</b>	<b>D</b>	<b>DK</b>	<b>I</b>	<b>PL</b>	<b>S</b>	<b>UK</b>
3.5%	27%	3.5%	23%	8%	12%	23%

The contributions of the collaborating parties may be in cash or in services.

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