

ENSAR

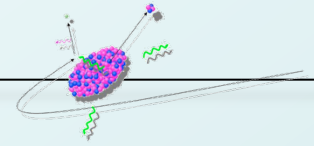
**HIGH INTENSITY
STABLE ION BEAMS
in EUROPE**



ECOS: European Collaboration on Stable ion beams



NuPECC is an Expert Committee of the European Science Foundation

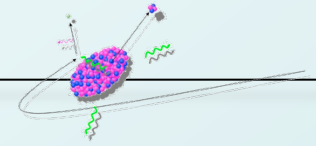


FUSHE 2012

Workshop on

FUture **Super-Heavy Element Strategy**

ENSAR ECOS task 2
*synergies in the field of
SHE research*

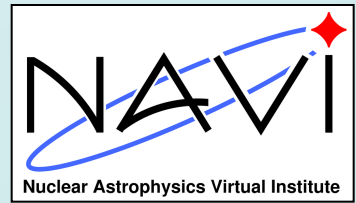
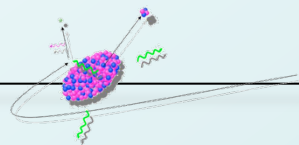


ECOS Task 2 has the objective to promote **synergies in the field of Super-Heavy Element (SHE) research**, described as follows:

*"For this task ECOS is aiming for **bringing together the groups with research activities on SHE using high-intensity ion beams** for an exchange of new ideas and techniques related to the use of very high intensity stable beams. In particular, Task 2 will propose an **optimisation of resources** (beam time, target technology, detectors) in the field of SHE research **among TNA facilities**."*

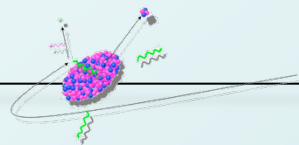
The **ENSAR-ECOS** Workshop on **FUture Super-Heavy Element Strategy – FUSHE 2012** is one very important milestone in this process. It will provide a **forum for the SHE community to discuss and define the future strategy to reach** the common goal – the establishment and investigation of the region of spherical shell-stabilised super-heavy nuclei – the so called **"Island of Stability"**.

FUSHE is organised and/or supported by



ENSAR-ECOS NA

- timeline



	2010			2011			2012						2013					2014					
Month	1 9	3 11	5 1	7 3	9 5	11 7	13 9	15 11	17 1	19 3	21 5	23 7	25 9	27 1	29 1	31 3	33 5	35 7	37 9	39 11	41 1	43 3	
ECOS NA02																							
FUSHE 2012					0.		1.		2.														

- joint workshop and coordination committee meeting
- joint workshop, coordination committee and town meeting
- Network setup
- Dedicated ECOS Web page on the ENSAR Web site available
- Report Task 1-3
- FUSHE 2012 circulars
- FUSHE 2012 strategy paper preparation



workshop

- Experiment
- Theory
- Instrumentation

Goal:

Discuss and define the (near and far) future strategy for the field of SHE research

Experiment

- Z- and A identification of the isotopes produced in ^{48}Ca -induced reactions on actinide targets
- Single particle trends towards the gap of the spherical SHE
- Ground state properties (e.g. masses)
- Decay properties (fission barriers, lifetimes) of SHE
- Chemical properties
- Reaction mechanism
- Collective properties/in beam spectroscopy

- Experiment
- Theory
- Instrumentation

Goal:

Discuss and define the (near and far) future strategy for the field of SHE research

Theory

- Spherical and deformed shell gaps, density profiles, stabilization mechanisms (shell, vibrational etc.).
- Structure of ground and low-lying excited states of SHN: energies, spins, parities, transition strengths, isomerism
- Evolution of ground state shapes and fission barriers as function of Z and A , and limits of the region of SHE
- Excitation energy dependence of fission barriers
- Evolution of di-nuclear systems: contact to capture, fusion-fission, deep-inelastic collision etc.
- Energy transfer, dissipation-fluctuation dynamics in nuclear reactions.
- A review of the relevant models and guidance for future experiments.
- SHE quantum chemistry
- Astrophysical relevance for SHE

- Experiment
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Goal:

Discuss and define the (near and far) future strategy for the field of SHE research

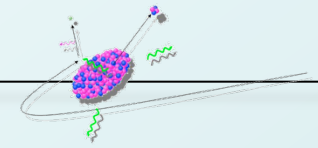
Instrumentation

- High intensity stable beam accelerator
- High current/low energy target development
- New separators (S3, M/Q- or other mass selection/spectroscopy)
- Detector development
- Inbeam spectroscopy/target (gammas, electrons,...)
- Decay spectroscopy/after separation (ERs, alphas, gammas, electrons, X-rays)
- Electronics (digital, pulse shape analysis,...)
- Ion traps
- Laser spectroscopy
- Chemistry instrumentation (gas-jet transport system; ion-exchange, solvent extraction, electro-chemistry apparatuses; gas-chemistry apparatuses; chemistry apparatus coupled to recoil separators, detectors coupled to chemistry apparatus)

Workshop Structure

The workshop comprises **7 x ½-day sessions**

- the sessions are organised with a combination of **invited talks followed by a topical discussion**. There will be no call for contributed talks. However, (short) contributions are encouraged for the topical discussion.
- the workshop is guided by a number of **convenors** (6) and **discussion leaders** for each session
- a writing group consisting of the convenors discussion leaders and the OC (chairs, scientific secretaries and volunteers) will produce a **paper describing the possibilities and visions for the field of SHE** on the basis of the discussions during the workshop and the
 - Summary documents produced by the speakers beforehand
 - Summary and synthesis of the discussion
- **under the advice the paper will be published on the FUSHE and ENSAR/ECOS websites and possibly in an international peer reviewed journal**



FUSHE 2012 - Venue



The **Conference&Sports Hotel Erbismühle** is located in a nice valley, the *Weital*, in the *Taunus hills* about 50 km north of Frankfurt (50 km to Frankfurt main station and 55 km to Frankfurt airport) close to the *village Weilrod* in the centre of Germany.

72 rooms €90 (€60 double occupation) + interesting food option

The *Taunus hills* have formed the northern border of the Roman Empire and traces of it can still be visited today like the rebuilt Roman Castle *Saalburg* together with a few meters of the *limes*, the Roman border installations and defence line against the barbarians north of it...

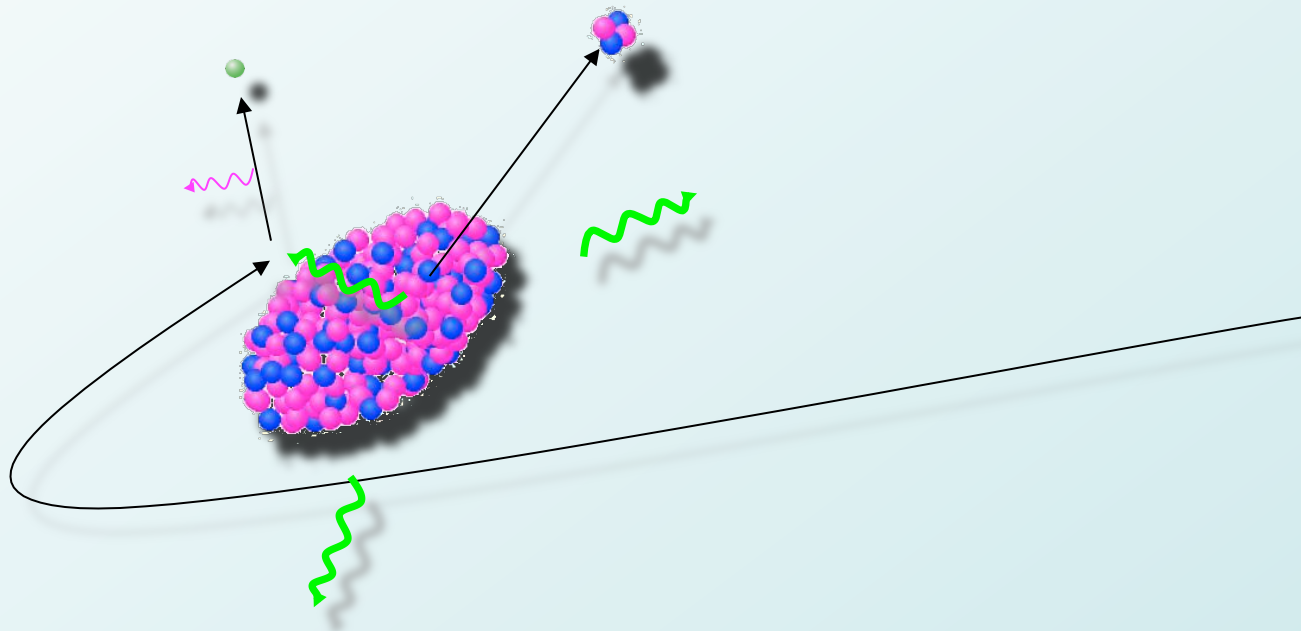
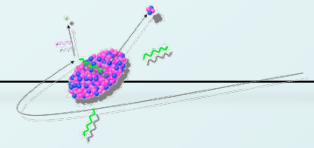


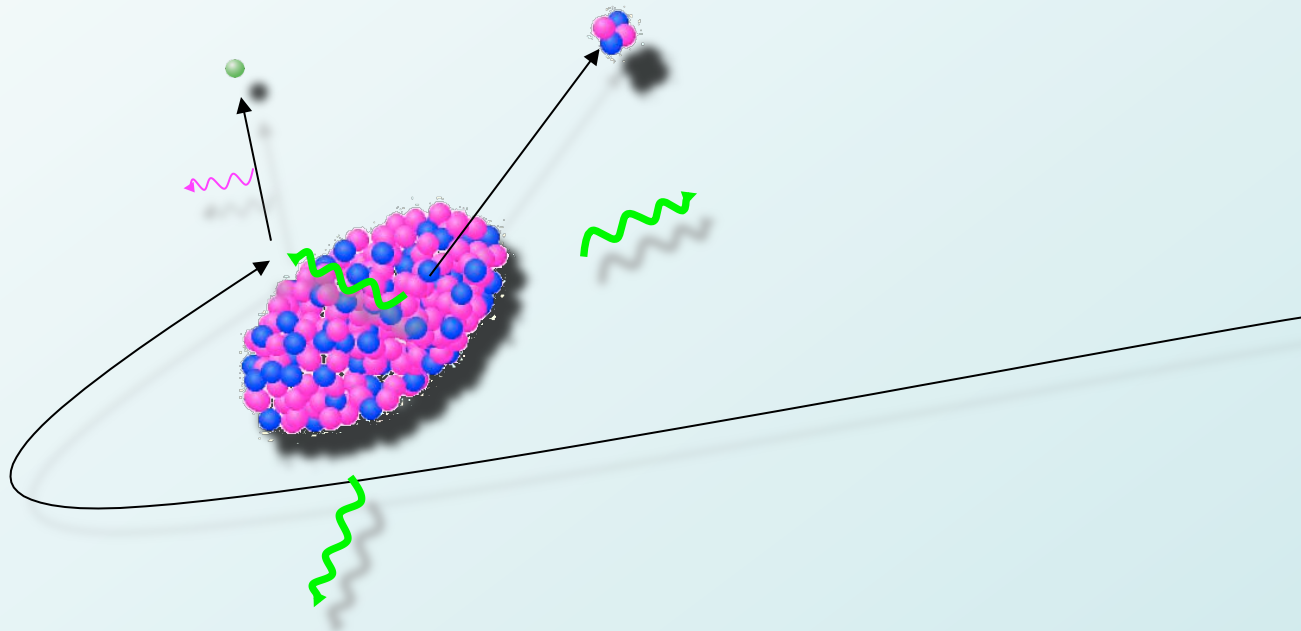
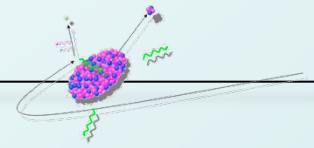
D. Ackermann (chair – GSI)
D. Boilley (co-chair – GANIL)
E. Litvinova (scientific secretary – GSI)
Ch. Stodel (scientific secretary – GANIL)
B. Avez (CENBG)
M. Block (GSI)
P. Greenlees (JYFL)
K. Hauschild (CSNSM)
D. Jacquet (IPNO)
K. Jadambaa (GSI)
R. Lozeva (IPHC)
B. Sulignano (IRFU)

FUSHE 2012 - Advisory Committee



M. Bender	CENBG, Bordeaux, France		
J.P. Delaroche	CEA, Bruyères le Chatel, France		
A. Drouart	IRFU, Saclay, France	France	6
J. Dudek	IPHC, Strasbourg, France	Germany	4
K. Eberhard	U. Mainz, Germany	Japan	3
H. Haba	RIKEN, Wako, Japan	Finland	2
P.H. Heenen	U. Brussels, Belgium	Poland	2
R.-D. Herzberg	U. Liverpool, U.K.	U.S.A	4
F.P. Heßberger	GSI, Darmstadt, Germany	Belgium	1
T. Khoo	ANL, Argonne, U.S.A .	Russia	2
H. Koura	JAEA, Tokai, Japan	U.K.	1
M. Leino	U. Jyväskylä, Finland	Switzerland	1
K. Morita	RIKEN, Wako, Japan		
W. Nazarewicz	U. Knoxville, U.S.A.		
H. Nitsche	LBNL, Berkeley, U.S.A.		
Yu.Ts. Oganessian	JINR-FLNR, Dubna, Russia		
V. Pershina	GSI, Darmstadt, Germany	Total	26
J. Roberto	ORNL, Oakridge, U.S.A.		
H. Savajols	GANIL, Caen, France		
A. Sobiczewski	U. Warsaw, Poland		
Ch. Theisen	IRFU, Saclay, France	Experiment	17
A. Türler	PSI, Villigen and U. Bern, Switzerland	Theory	9
J. Uusitalo	U. Jyväskylä, Finland		
A. Wieloch	U. Cracow, Poland		
A. Yakushev	GSI, Darmstadt, Germany		
V. Zagrebaev	JINR-FLNR, Dubna, Russia		





SHE Synthesis and Nuclear Structure of SHE

- Roadmap/Long Term

Possible GSI acc. schemes:

