

Norwegian Nuclear Research Centre

Sunniva Siem

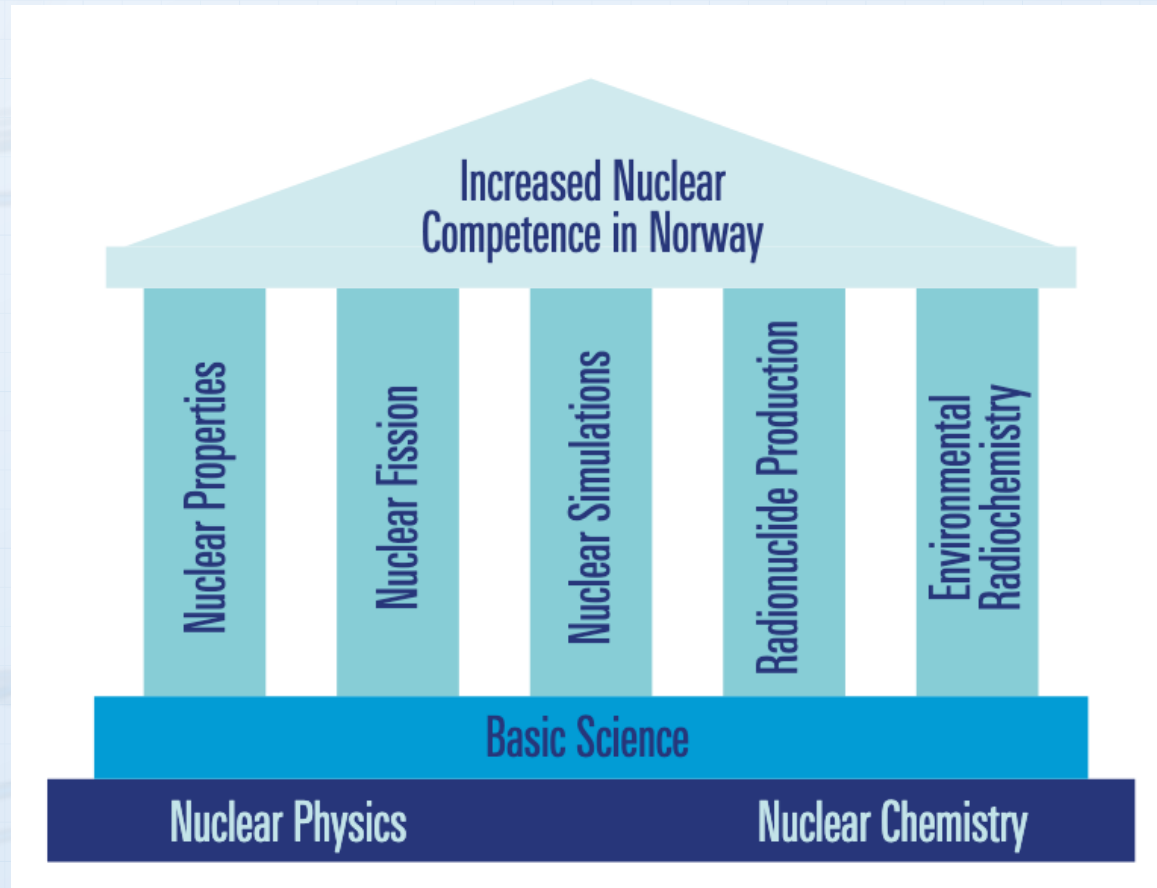
University of Oslo & NNRC





- **13th** Nordic Meeting was organized in Saariselkä, **Finland** in April **2015**
- **12th** Nordic Conference on Nuclear Physics Stockholm, **Sweden**, 13–17 June **2011**
- **11th** Nordic Meeting on Nuclear Physics **Denmark 2007**
- **10th** Nordic Meeting on Nuclear Physics Oslo, **Norway**, from May 12–16, **2003**
- **9th** Nordic Meeting on Nuclear Physics Jyväskylä, **Finland**, August 4–8, **1998**
- **8th** Nordic Meeting on Nuclear Physics Ronneby Brunn, **Sweden** June 5–9, **1995**
- **7th** Nordic Meeting on Nuclear Physics Vigsø in Denmark **August 17–21, 1992**
- **6th** Nordic Meeting on Nuclear Physics Kopervik, Norway August 10–15, **1989**
- **5th** Nordic Meeting on Nuclear Physics Jyväskylä, Finland March 12-16, **1984**
- **4th** Nordic Meeting on Nuclear Physics Fuglsø, Denmark August 16–20, **1982**
- **3rd** Nordic Meeting on High Energy Reactions in Nuclei, Geilo, Norway, January 8-12, **1979**
- 2nd in 1977?
- 1st in 1975?

Norwegian Nuclear Research Centre



Partners:



UiO



Forskningsrådet

Funding: 200 MKr (ca 20 M Euro)
over 8 years, 2023-2031

Our mandate from the Research Council of Norway:



Purpose

The purpose of this call is to strengthen Norway's research capacity and competence in the nuclear field through long-term investments in nuclear physics and nuclear chemistry research.

Thematic delimitation

The call targets Norwegian research groups in nuclear physics and nuclear chemistry.

Funding will go to basic high-quality research of relevance to

- radiation protection and radiation safety
- nuclear safety and nuclear preparedness, including knowledge about safety and security at nuclear power plants and action taken in the event of release of radioactivity to the environment (radioecology)
- manufacturing of radionuclides for medical and industrial use, for example in radiopharmacy
- decommissioning of nuclear power plants and radioactive waste management



Centre Director:
Sunniva Siem
Professor
Nuclear Physics, UiO



Deputy Director
Deborah Oughton
Professor
Nuclear Chemistry
NMBU



Deputy Director
Georgios Kalantzopoulos
Head of the
Department of Tracer
Technology at IFE



Eda Sahin (RT1)
Professor
Nuclear Physics,
UiO



Ali Al-Adili (RT2)
Adjunct Professor II UiO
Uppsala University



Ole Reistad (RT3)
Adjunct Professor II UiO
DNV



Liv Stavsetra (RT4)
Seniorforsker
Sporstoffteknologi,
IFE



Ole Christian Lind (RT5)
Professor
Nuclear Chemistry
NMBU

Lindis Skipperud (Education)
Professor
Nuclear chemistry,
NMBU



Andreas Gørgen (Education)
Professor
Nuclear Physics,
UiO



Gøril Mellem
Centre
Coordinator

New bachelor “Nuclear physics and Nuclear technology” at UiO from 2023:

3 årig bachelor UiO:

Kjernefysikk og nukleær teknologi



Very popular:

2023: 76 applicants had it as first choice, 600 applicants in total.

2024: 74 applicants had it as first choice,

2025: 86 applicants have it as first choice

2026: 88 applicants have it as first choice 648 applicants in total

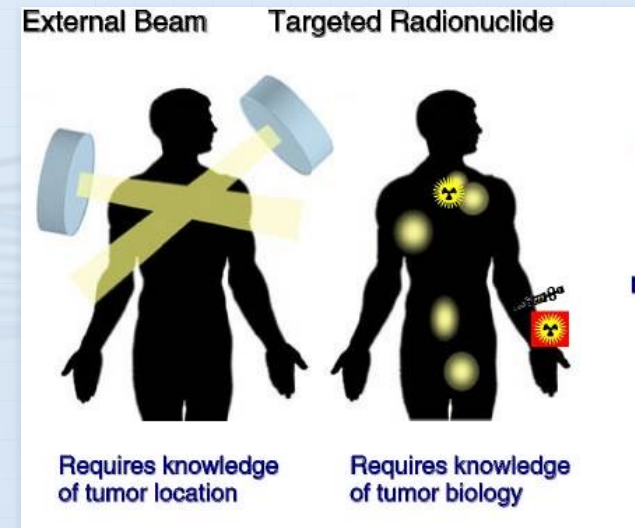
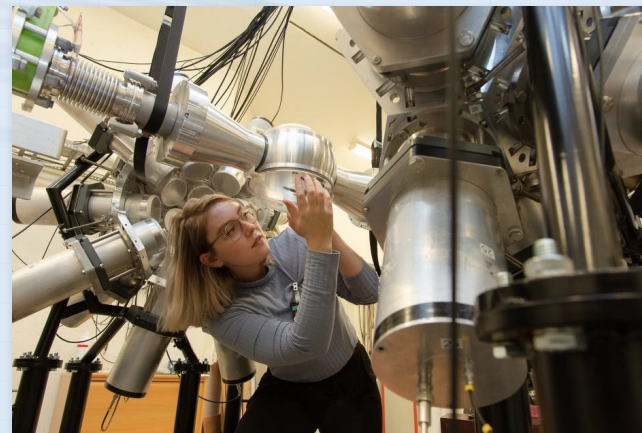
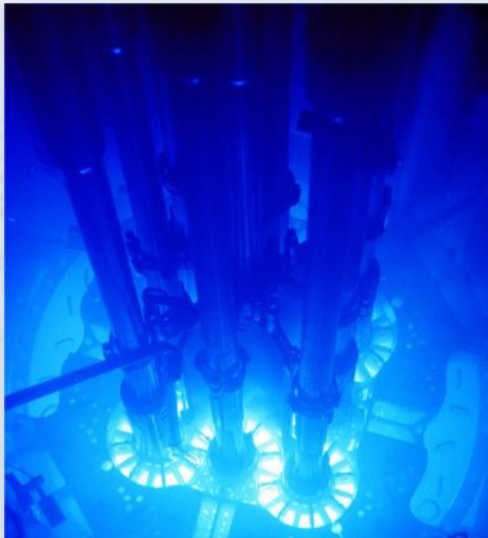


← Studier ← Finn studier

Nukleærteknologi

Utdanningstype: Varighet: Studiepoeng:
Master 2 år 120

På master i nukleærteknologi fordyper du deg i atomkjernens egenskaper og oppførsel, og du blir en del av et ledende forskningsmiljø. Du kan spesialisere deg innen alt fra bruk av stråling i medisin til utviklingen av reaktordesign og brensel for kjernekraft.



Applications of nuclear technology in for example energy and medicin

Associate partners:



Viljr.

Collaborators:



We are thankful that both industry and academic partners who contribute to supervision of master and PhD students



Amanuensis-II/Professor-II in NNRC who contribute with research, teaching and supervision of students.



Sunniva J. Rose
Norsk Kjernekraft



Ole Reistad
DNV



Bent Schoultz
Norsk Medisinsk syklotronsenter



Syed Nuruddin



Tellef Storebakken*
Advansia



Tomas K. Eriksen



István Szôke



Liv Stavsetra



Håvar Gausemel
Bayer AS



Sindre Hassfjell
Thor Medical AS



Verena Pichler
Wien University



Ali Al-Adili
Uppsala University

IFE

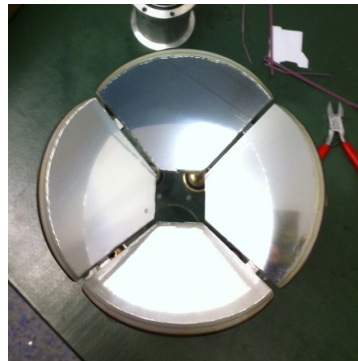
Oslo Cyclotron Laboratory

Research topics the Nuclear Physics group:

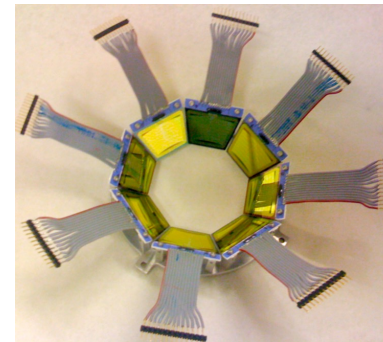
- Nuclear structure
- Nuclear astrophysics
- Nuclear Fission
- Energy applications
- Medical isotopes R&D
- Technology: detector development etc



OSCAR (gamma detectors)



Old PPAC (fission det.)



SiRi (particle det.)



Cyclotron

Research theme 1: Nuclear properties

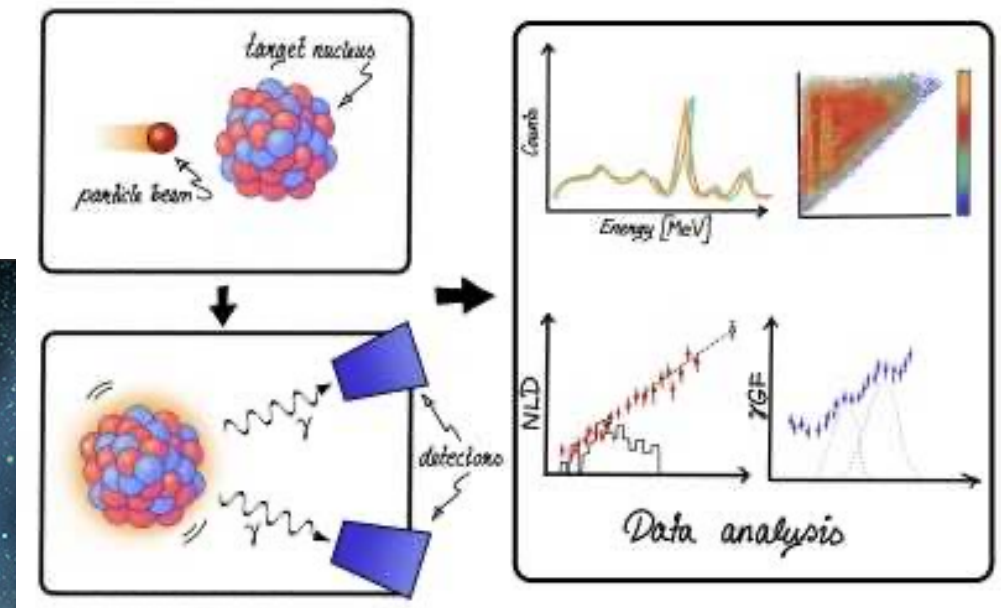


Figure by Trine Olafsen

Covered in 7 Talk by:
Johannes Heines,
Wanja Paulsen
Maria Markova,
Claudia Grieg,
Lauren Bell,
Jon Kristian Dahl,
Hyeji Lee



Research theme 2: Nuclear Fission

Covered in 2 talks by
Neeraj Kumar
Marius Torsvoll

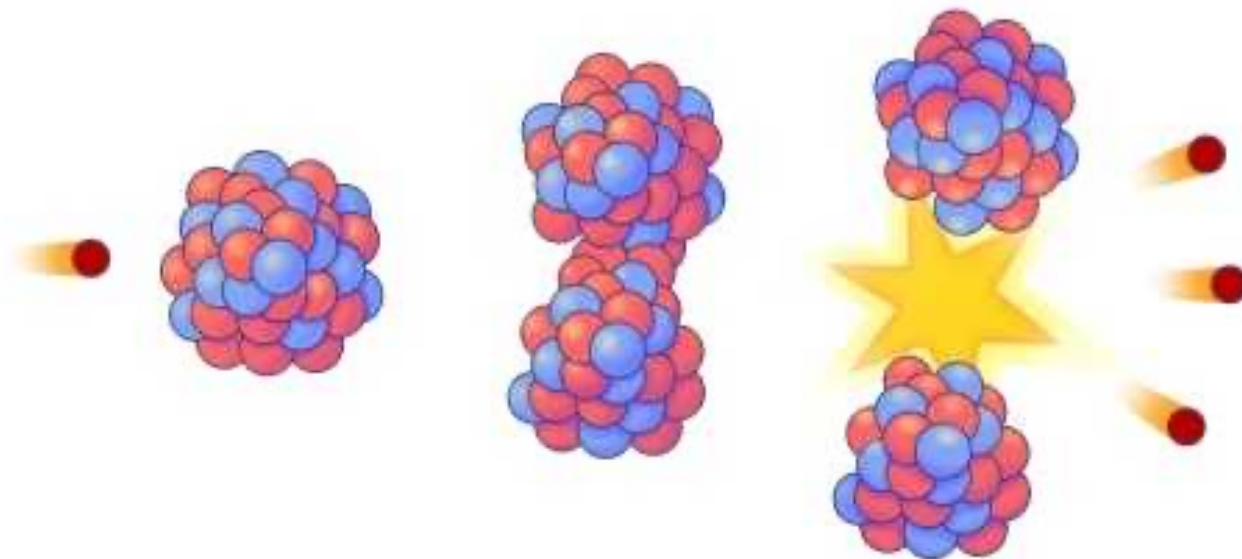
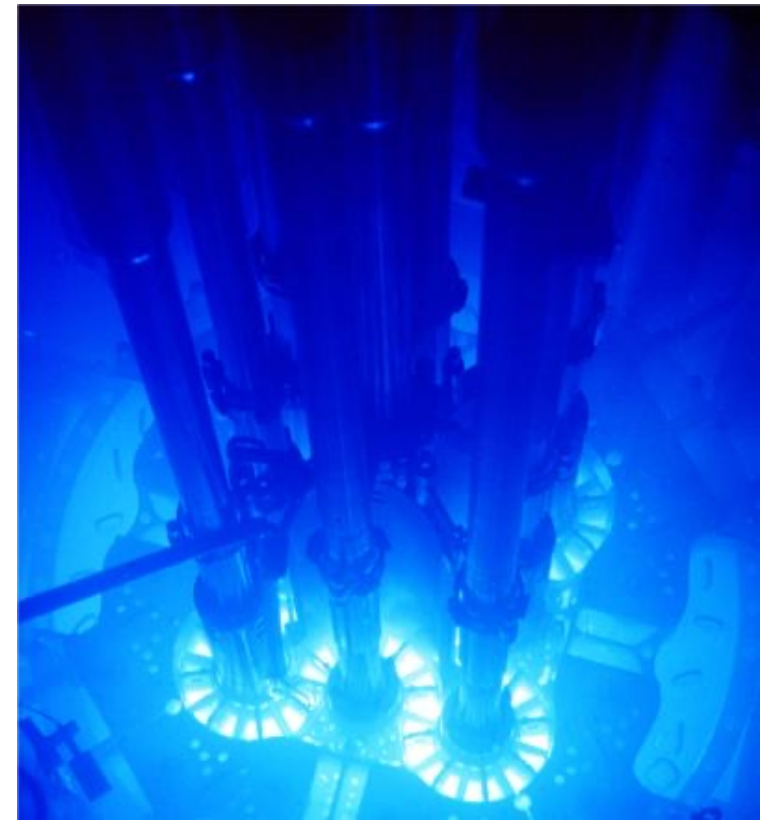


Figure by Trine Olafsen



Research theme 3: Nuclear Simulations

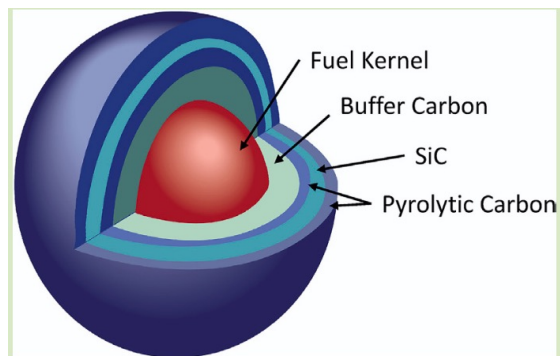
For example:

- Reactor simulations, new reactor/fuel design
- SMR and Nuclear Microreactors for Remote and Maritime Application
- Decommissioning of Norway's research reactors

Covered in 4 talks by
Baltasar Hemmerle
Gulla Torvund
Jessica Chow
Josef Hisanawi



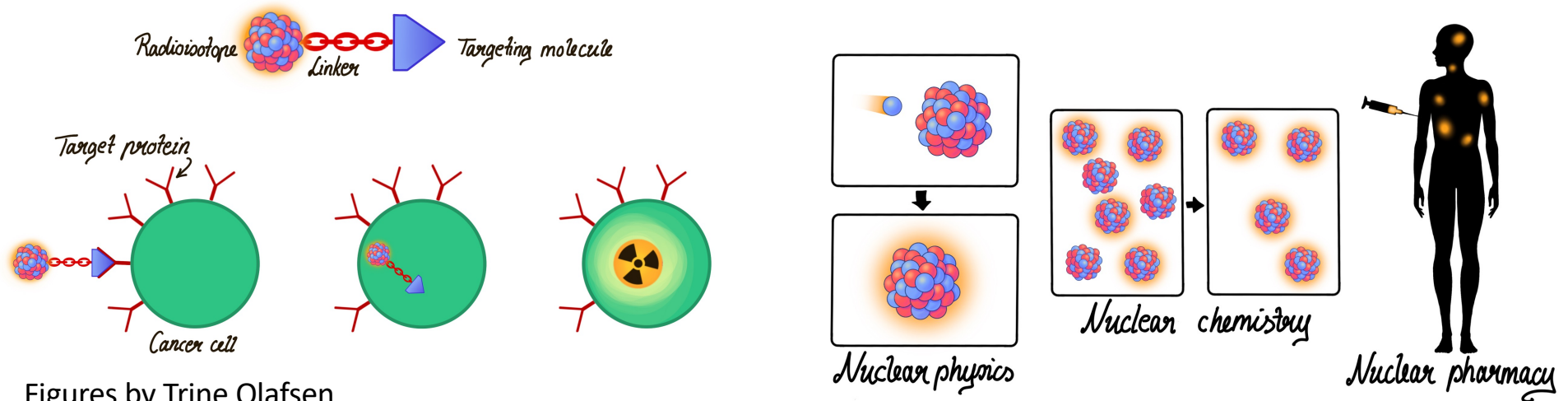
Halden reaktor (1958 – 2018)



Research theme 4: Radionuclide production

Interdisciplinary:

- Nuclear physics: cross sections etc for production of radionuclides.
- Nuclear chemistry: chemical purification of radionuclides
- Radio pharmacy: production of drugs based on radionuclides



Production and biodistribution of Sr-82

E. M. Martinsen^{1,2}, T. Arino³, A. S. Voyles³, S. Siem^{1,2}, R. Abergel³, *et al.*

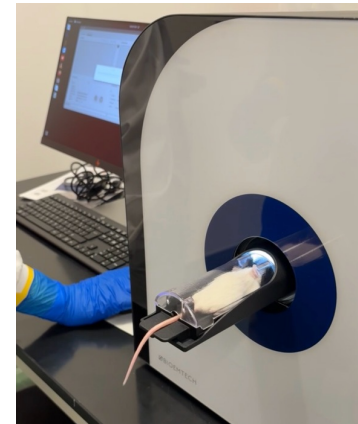
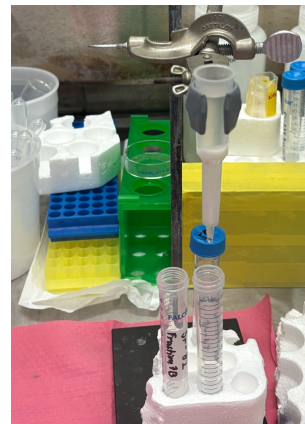
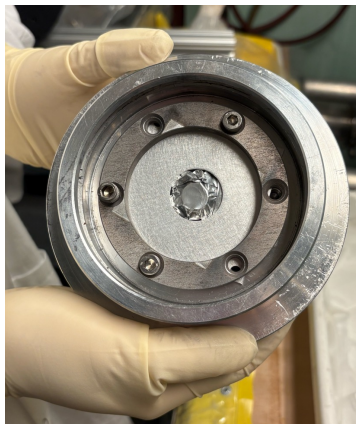
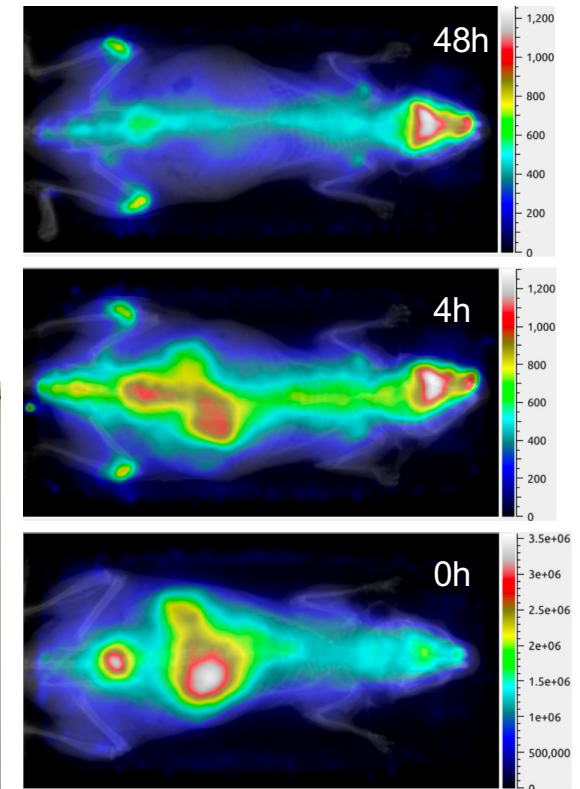
¹Department of Physics, University of Oslo, Blindern 0315 Oslo, Norway

²Norwegian Nuclear Research Centre, Blindern 0315 Oslo, Norway

³Lawrence Berkeley, National Laboratory, Berkeley CA, 94720 USA



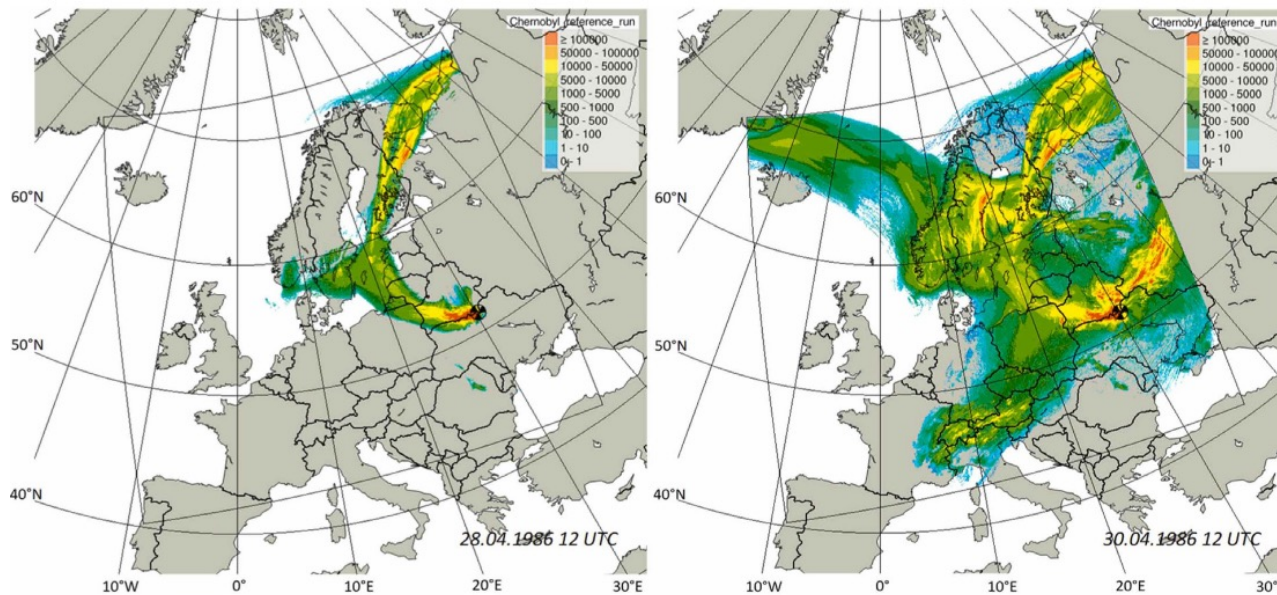
- A target of natural abundant RbCl was made using a powder press to produce ^{82}Sr through Rb(p,x) reactions. The target was irradiated with 55 MeV protons from September 24th to September 26th 2025.
- The irradiated target was dissolved in 8M HNO₃ and the produced strontium isotopes were separated from the rubidium using a Sr-resin produced by Eichrom.
- 4 female and 4 male mice were injected with 100μl buffer solution containing 250μCi ^{82}Sr .
- PET-scans of the mice were performed at 0h, 4h, 48h, 72h, 96h and 168h after injection.
- Organs from the mice were collected at the end of the experiment and were gamma counted separately.



PhD student Elise Malmer Martinsen



RT5: Environmental Radiochemistry and Source Characterisation



Close collaboration
With RT3

Fallout map of accumulated total deposition (wet + dry deposition) of ^{137}Cs (Bq/m²) at 28.04.1986 12 UTC (left panel) and 30.04.1986 12 UTC (right panel) after the Chernobyl accident. The dispersion is calculated by use of the SNAP model of the Norwegian Meteorological Institute and the original dry deposition scheme. Figure: Berge et al., A study of particle dry deposition parameterizations in an atmospheric radioactive preparedness model: Application to the Chernobyl case, Journal of Hazardous Materials, 474, 2024.

Example NNRC Education

NNRCs educational project «**STELLER – Stars and elements educational research**» develops a digital learning resource for upper secondary physics about how elements are created in stars and neutron star mergers.

Kjerner og stjerner

Bli med ut til stjernene, universets grunnstoffabrikker. Følg prosessene som lager grunnstoffene, og se hvordan forskere jobber for å finne ut av det.

Denne læringsressursen er utviklet i et samarbeid mellom Seksjon for fysikkdidaktikk, Norsk Nukleært Forskningscenter og Naturfagsenteret ved Universitetet i Oslo.

1 – Fusjon

I 1957 publiserte fire forskere en banebrytende artikkel med det de visste og ikke visste om hvor og hvordan grunnstoffene blir til.

Åpne

2 x 45 min

2 – Nøytroninnfangning

I 2017 observerte fysikere for første gang et sjeldent fenomen som hjelper forskerne å forklare hvordan tunge grunnstoff som for eksempel gull er dannet.

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2 x 45 min

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Since start of NNRC:
We increased from
7 -> 20 PhD students

From fall 2026 we will have
3 time as many master
students

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2 x 45 min



More information about
The centre activities can be
Found in our annual report.
Illustrations by Wanja Paulsen

https://www.nnrc.uio.no/om/nnrc_annualreport2025_final150326.pdf



Summary

- The Norwegian government is supporting research and education in nuclear science and nuclear technology:
 - Norwegian Nuclear Research centre (NNRC)
 - New study programs (=> 2 new permanent positions)
- Programs are very popular among students.
- NNRC: strong collaboration between academia and industry
- We welcome more collaboration: we have a very good experimental setup in Oslo, with OSCAR, SiRi and soon a new better fission detector.



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Thank you for your attention!

