

The Munich MP-Tandem Status



- Structure of MLL
- Tandem operation
- Experiments



Tandem hall



Am Coulombwall 6
85748 Garching
Germany
Tel. 089/289-14271
MLL@LMU.de

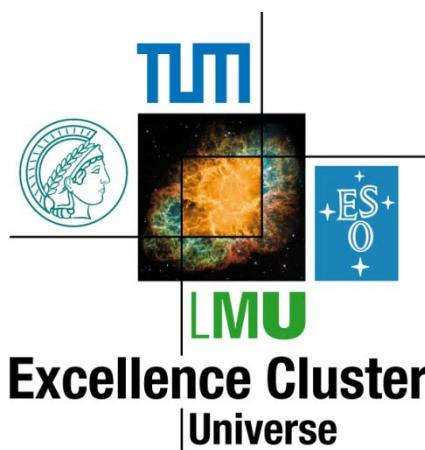
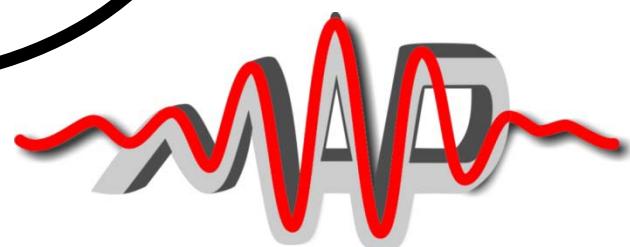
Who is involved?



Technische Universität München



LUDWIG-
MAXIMILIANS-
UNIVERSITÄT
MÜNCHEN



Excellence Cluster
|Universe

Cluster MAP
Munich Centre for Advanced Photonics

Where ?

FRM-II
UCN-Source

GSI
HADES

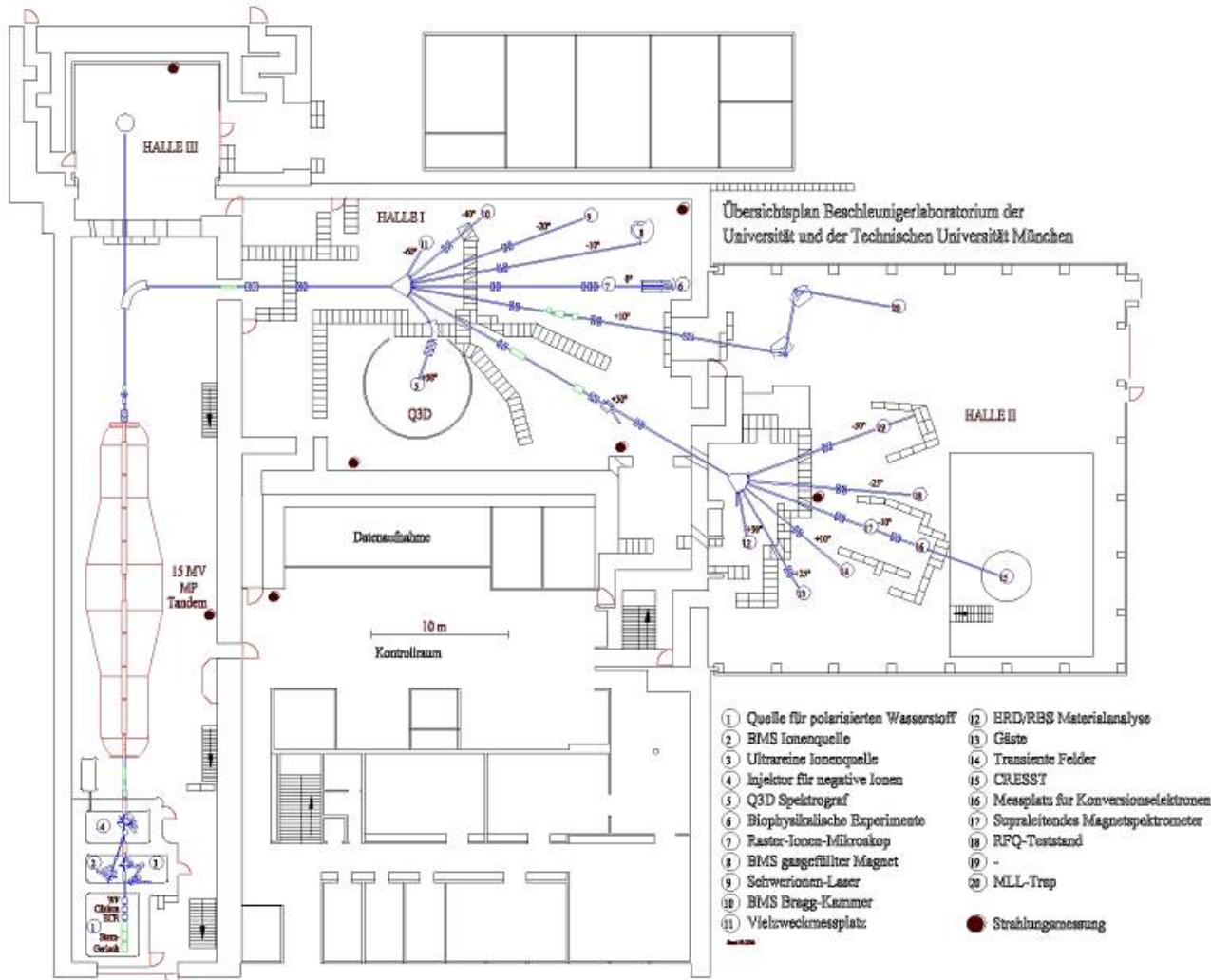
MLL-Physics:
(Applied) Nuclear Physics
(Astro-) Particle Physics
Hadronphysics

Gran Sasso
CRESST

CERN
Atlas(LHC)

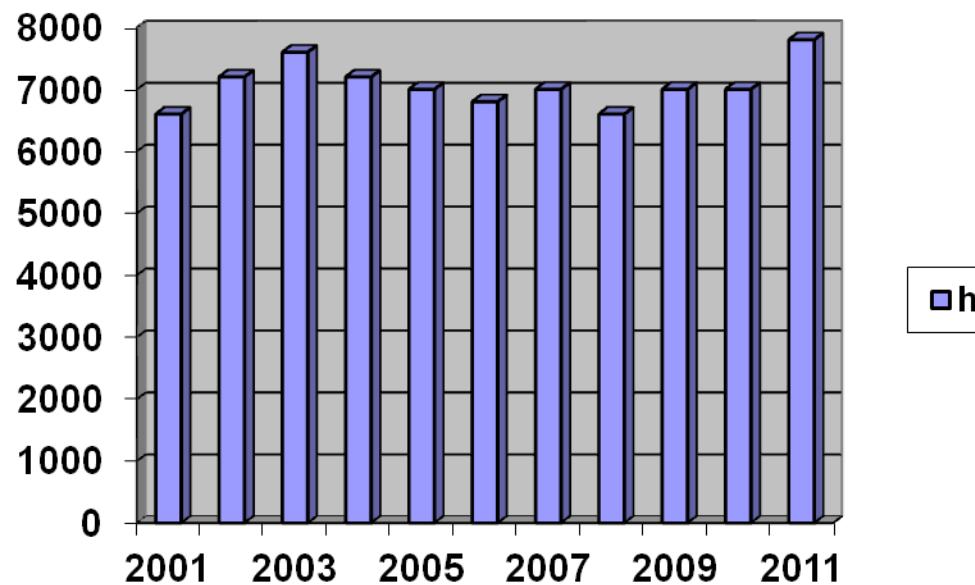
Tandem Lab

Tandem Laboratory Outline



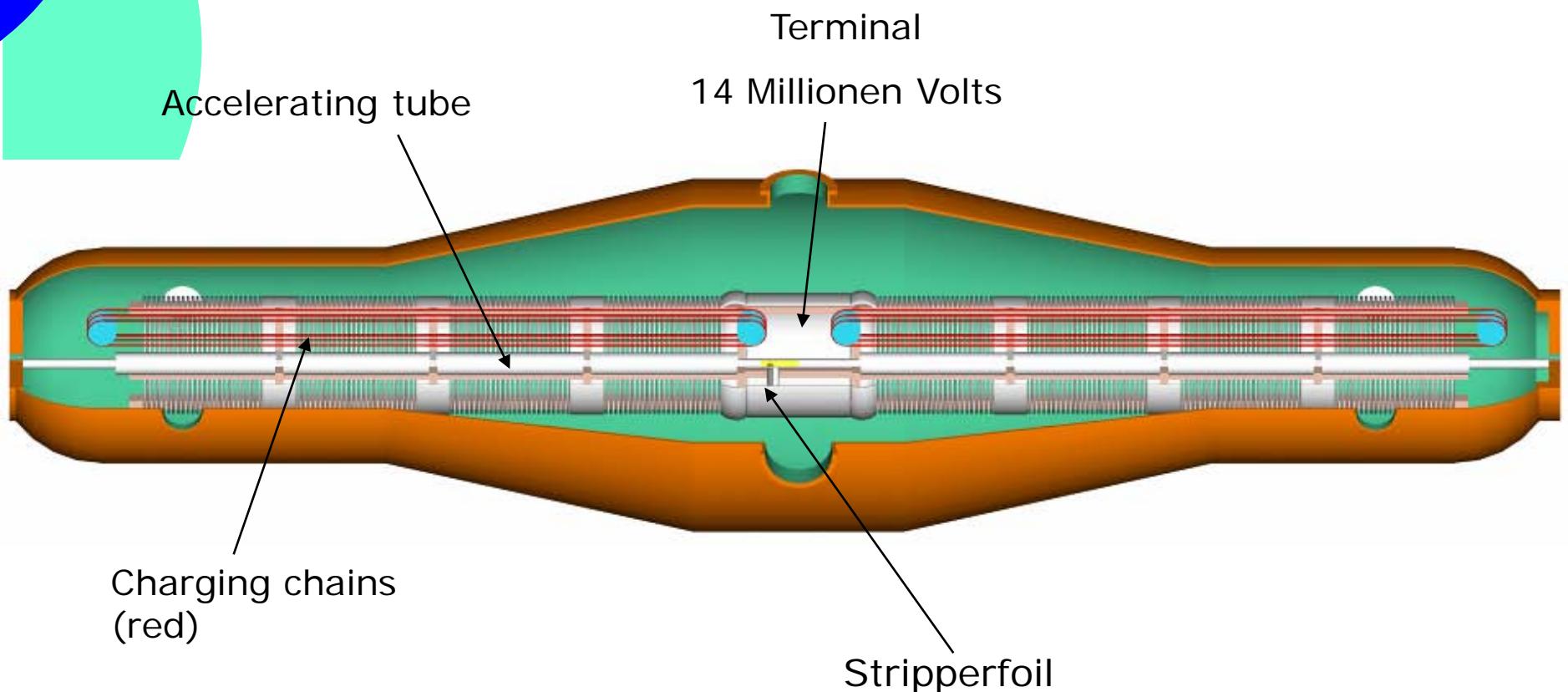
Operating statistics

- Reliable operation >6600h
- ~13 MV
- 5-10 tank openings/year



□ h

MP-Tandem van de Graaff®



2 sets of 3 charging chains

Charging Chains



Replacement of LE Charging chains



Why?

Installed August 2005

24 000 h of operation

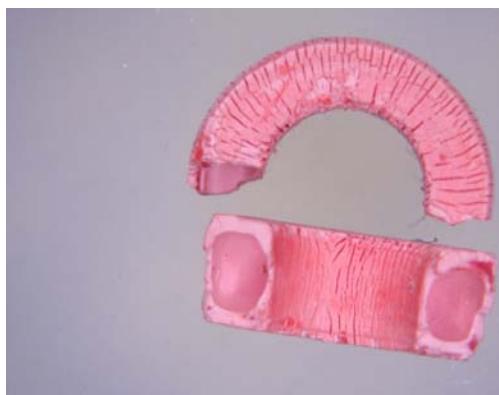
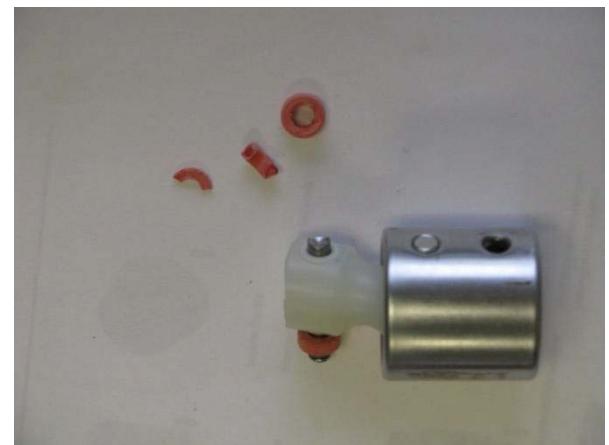
Replaced May 2009
(spacer problem)

Replaced April 2012
(rupture)

LE-Chain Spacer Problem

- Installed 8/2005
- Replaced 5/2009

Delrin since 1993 (Nylon before)
NEC delivers Nylon spacers again

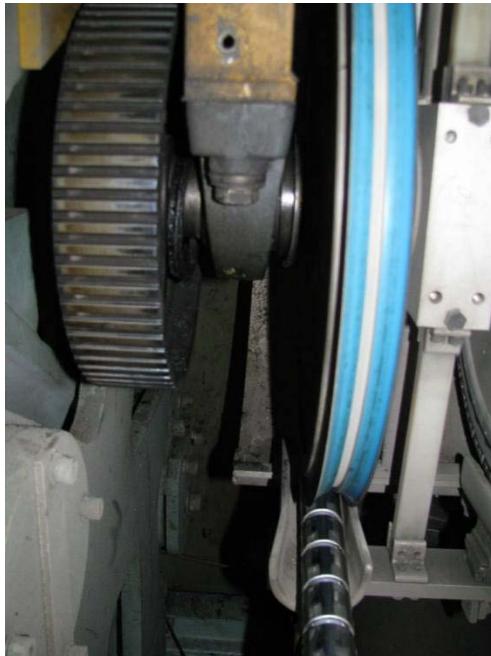


LE Chain Rupture 4/12



Cracks in many bones - replacement of the chain set

Replacement of HE Charging chains



Why?

Ripple in Terminal voltage correlated with chain speed.

Installed September 1990 !

130 000 h of operation

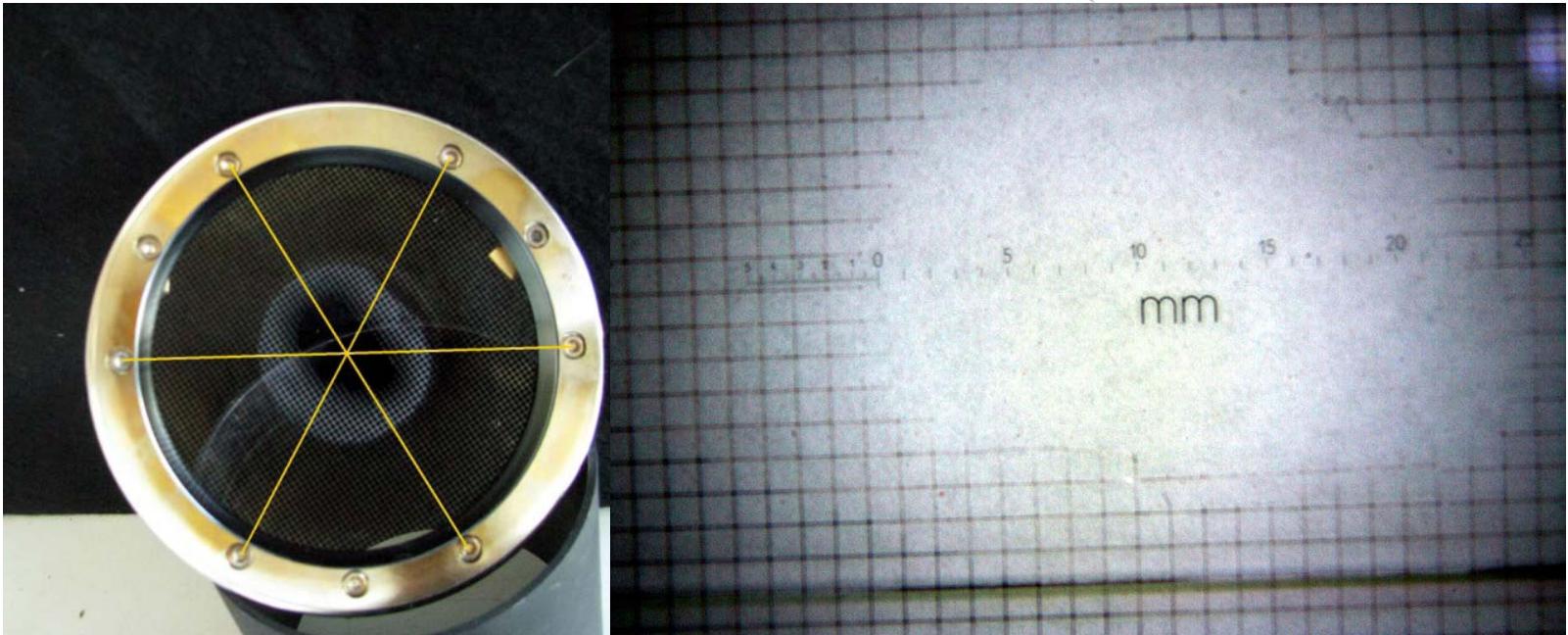
Replaced April 2009

Abrasion of the sheave rims!

10/2010-05/2012 old chains reinstalled – no problem
5/12 new chains again - ?

The reason for the abrasion is not found yet

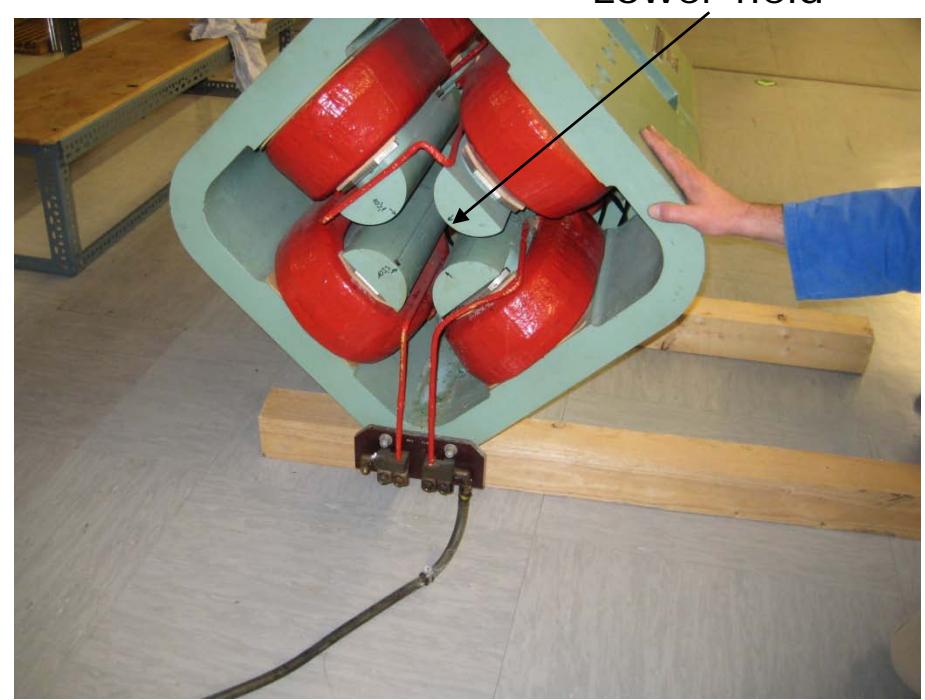
Lens 3 – Gridded lens



- Problems with beam optics (radiation at DS 2 with heavy Ions)
- Problem still not solved

Lens 5 – Tank exit

beam at maschine exit with y-deviation?
Solution: y-steering



Lens 5

Resistance: 0,4 Ohms all

Inductance: good coil 800 μH – bad coil 150 μH

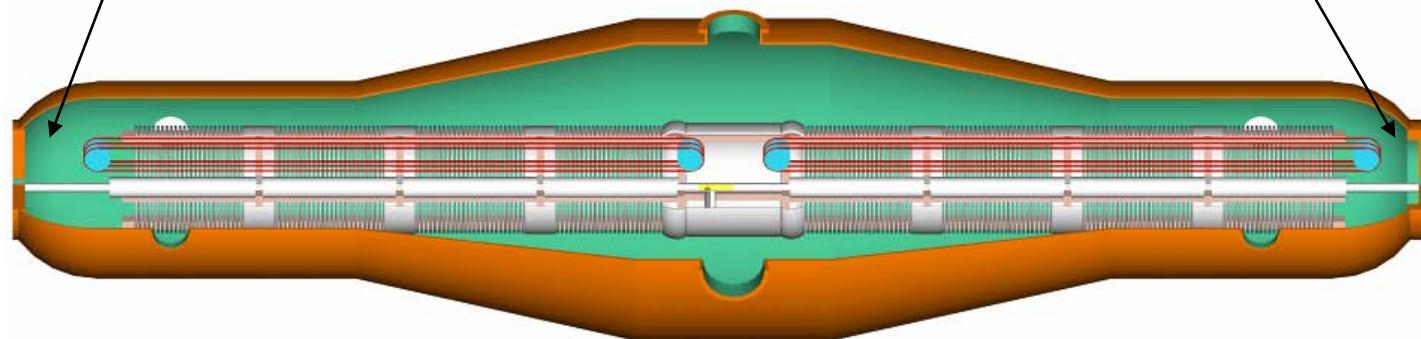


Replacement of all 4 coils in December 2008
(Spare coils from Heidelberg)

Idler Wheels - Storage



Storage in dry atmosphere!



SF₆

Date	kg	Manufacturer
9/2010	1800	Linde
6/2008	2500	Avantec (Vivitron)
5/2004	2700	Avantec (Vivitron)
8/2003	500	Solvey
11/2000	1800	Ausimont(Solvey)

Scientific Council of MLL

Operation for at least 5 years (period of clusters)

Problem: Retirement of all 4 operators in 2014/15



Staff demand from other MLL projects

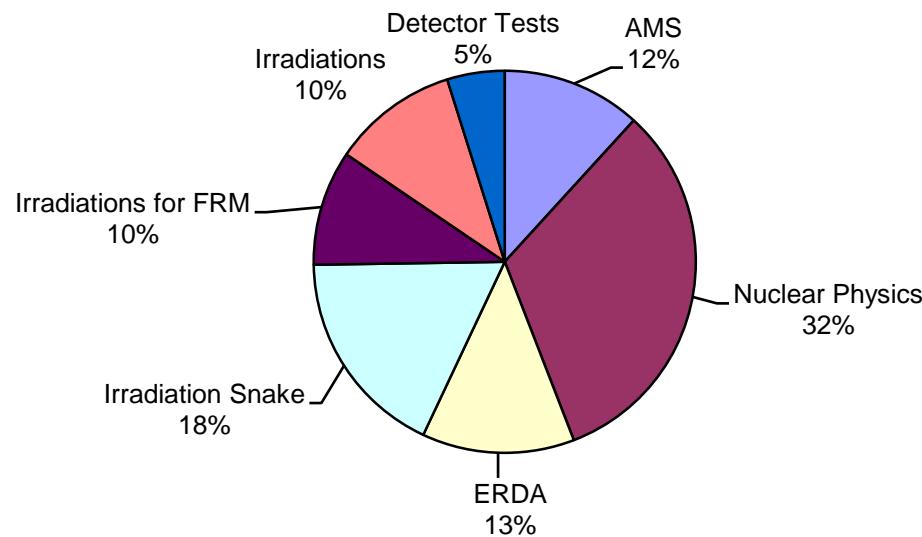
Part III: Experiments

- Nuclear Physics
- Applied Physics

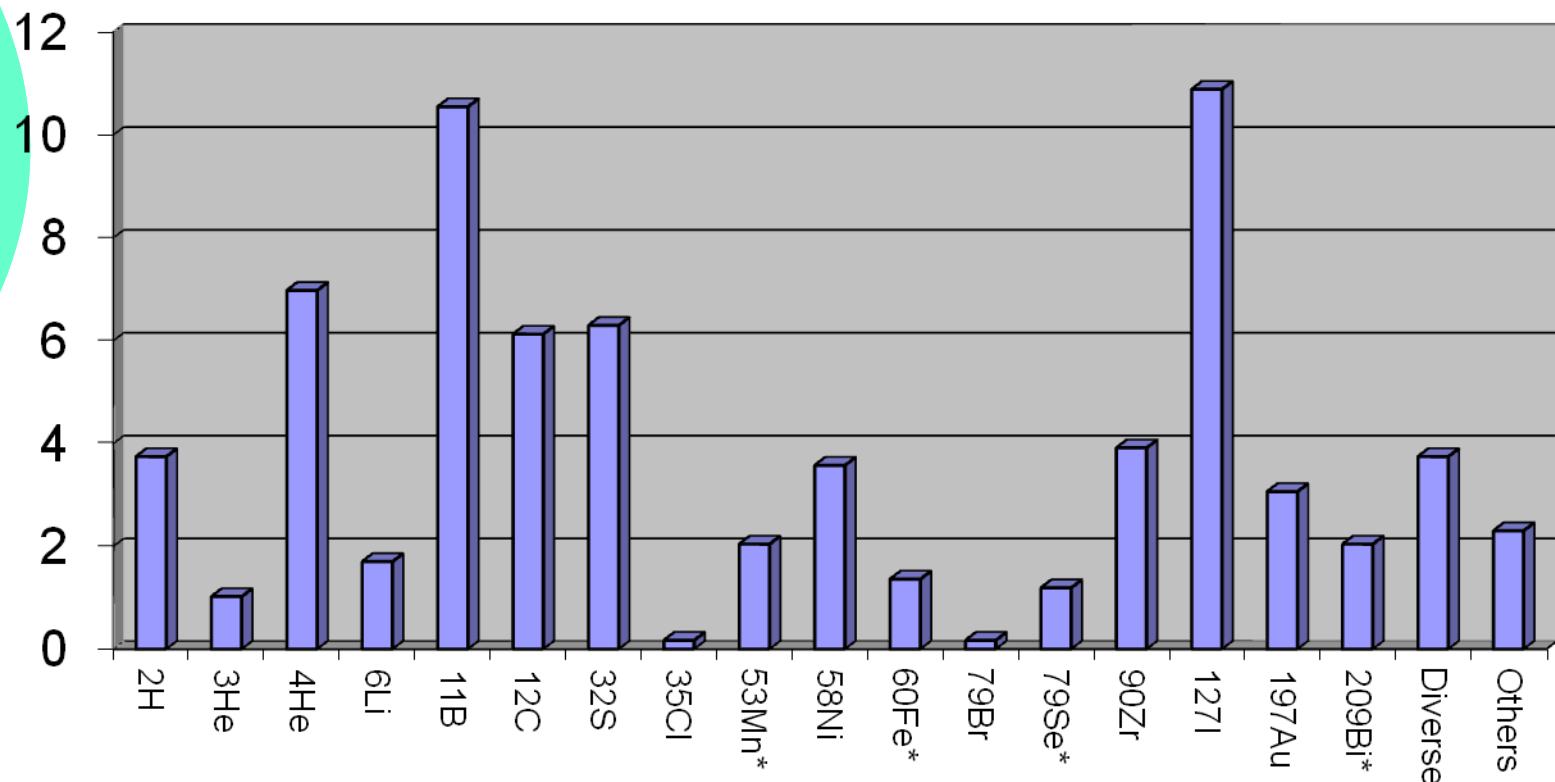
- Great demand for beamtime in the next years

Experiments 2011

Distribution of beam time to the experiments 2011



Ion Beam Time 2011



Ion beam time in percent of total available beam time.
 Isotopes marked with an * were measured in AMS studies

Spirit



<http://www.spirit-ion.eu>

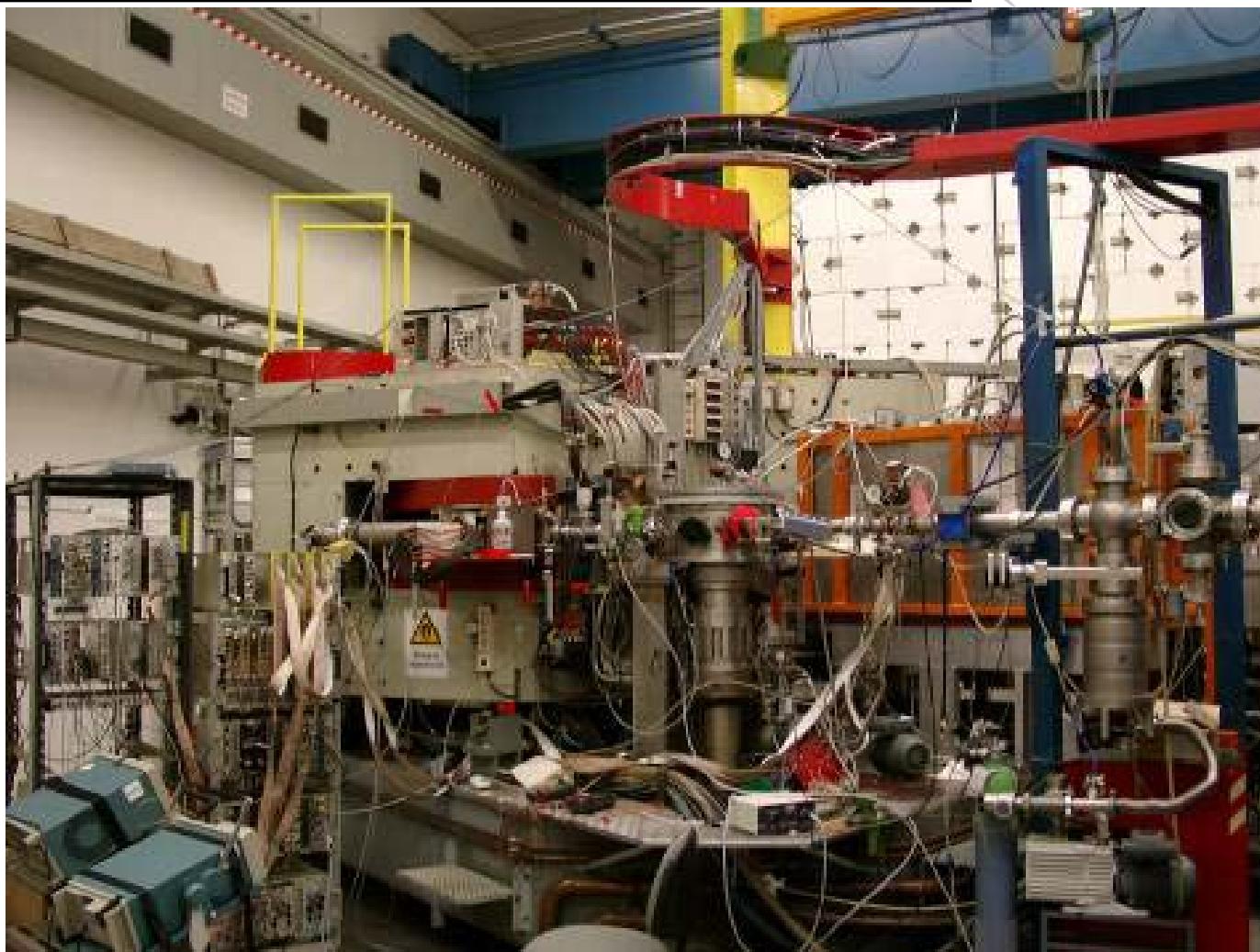
Support of Public and Industrial Research using Ion beam Technology

 SPIRIT represents an Integrated Infrastructure Initiative funded by the European Commission.

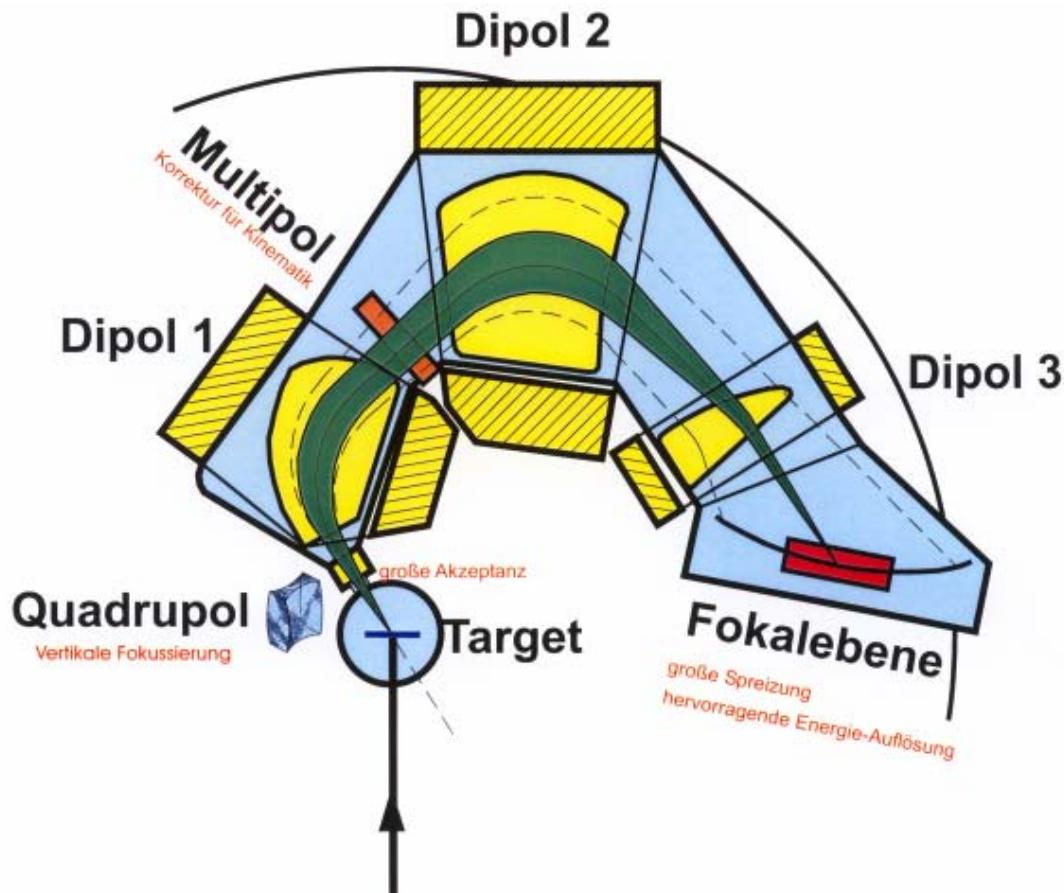
SPIRIT integrates 11 leading ion beam facilities from 6 European Member States and 2 Associated States.

7 partners provide TransNational Access to their facilities. Ions are supplied in an energy range from below 10 keV to more than 100 MeV for modification and analysis of solid surfaces, interfaces, thin films, and soft matter, in particular on the nanometer scale.

Q3D – Magnetic spectrograph

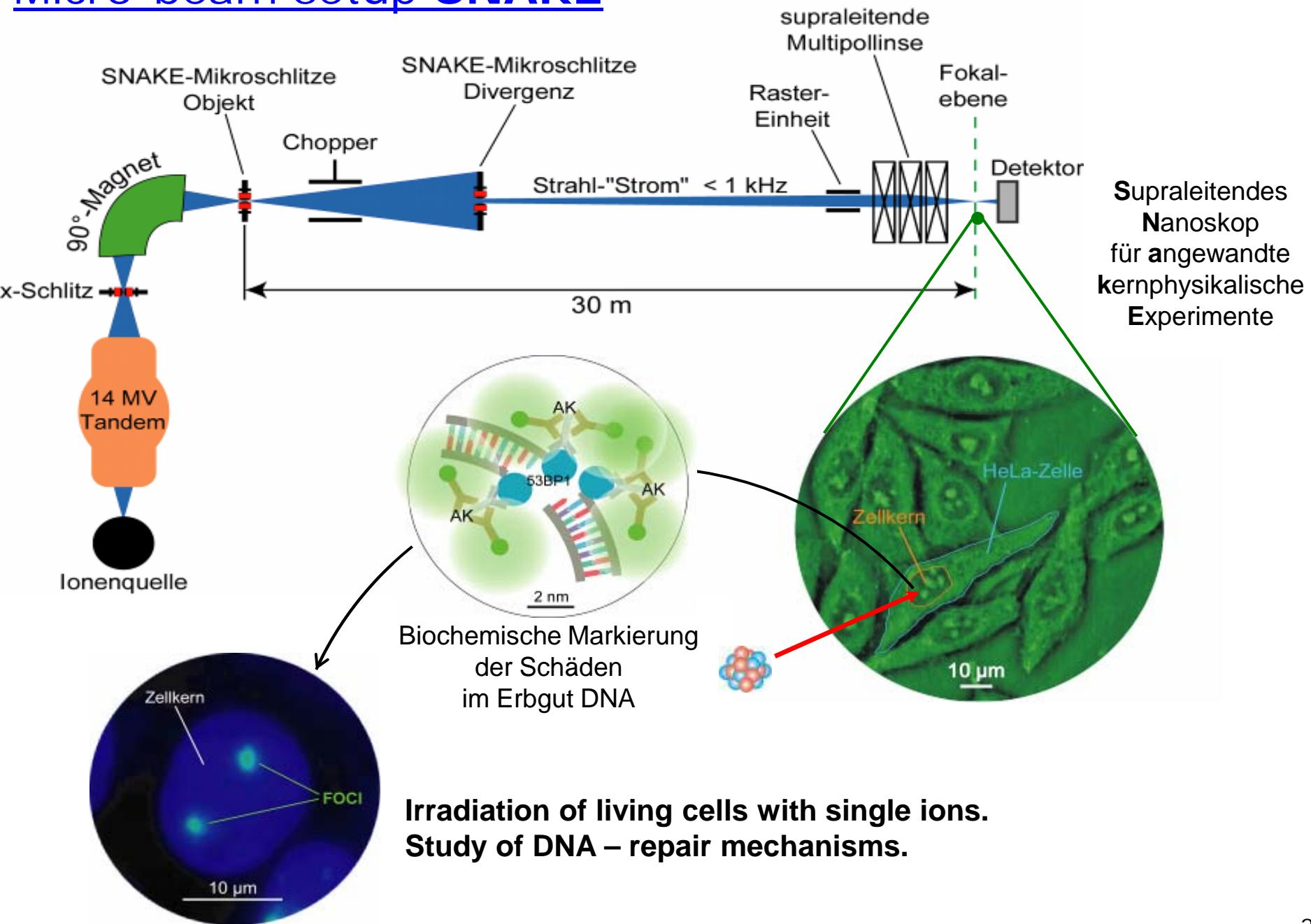


Q3D - Principle



- High resolution nuclear physics
- ERDA

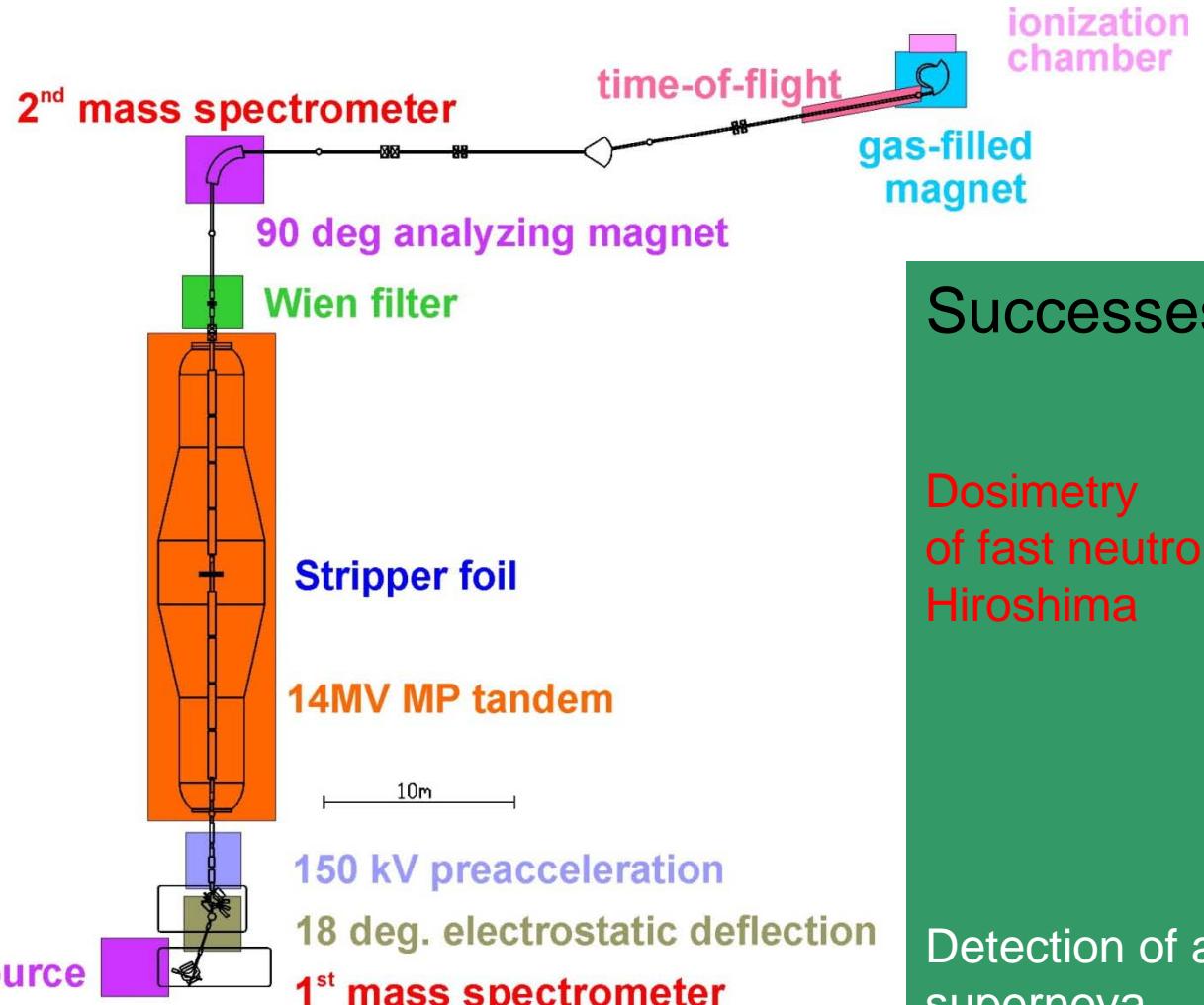
Micro-beam setup SNAKE





AMS Setup

ultrasensitive detection of isotopes up to 1 : 10 000 trillions (10^{-16})

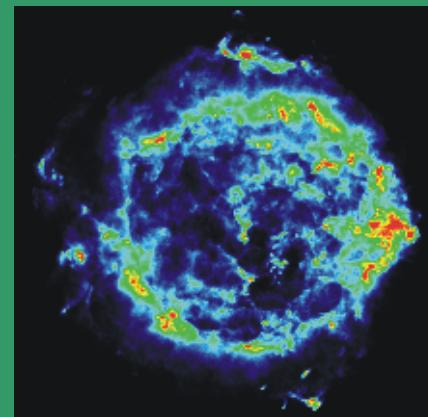


Successes:

Dosimetry
of fast neutrons
Hiroshima

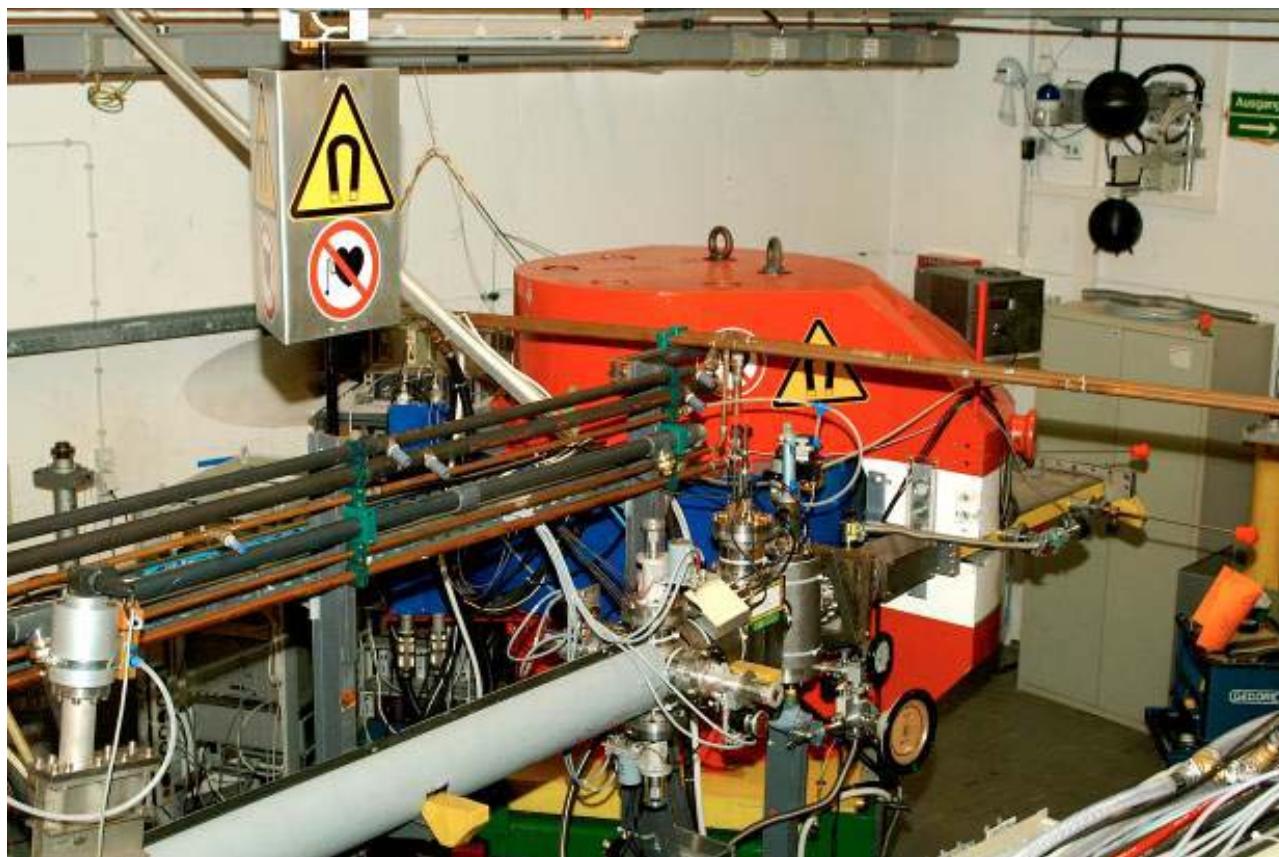


Detection of a
supernova
2-3 Mio. years ago



GAMS

Gasfilled Analysing Magnet System



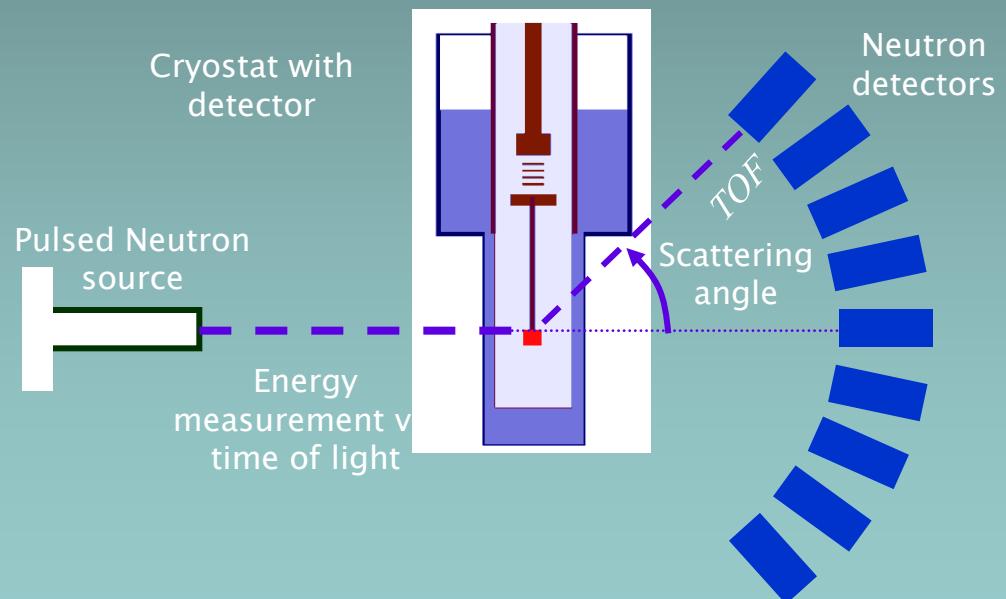
Separation of Isobars

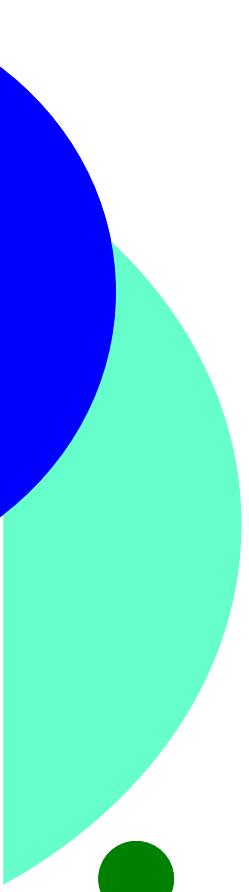
Detection of Dark Matter

- Development of cryo-detectors for the detection of dark matter candidates (WIMPs)
- Installation of a KELVINOX400 $^3\text{He}/^4\text{He}$ cryostate at MLL
- Test with neutrons hitting a CaWO_4 crystal at $\sim 10\text{mK}$



Experimental setup:





FINE



FINE