


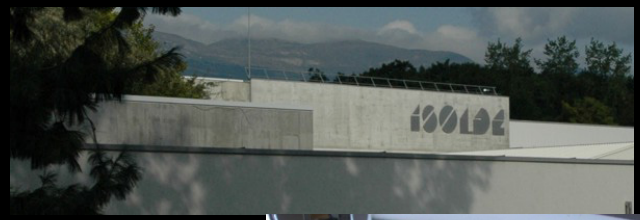



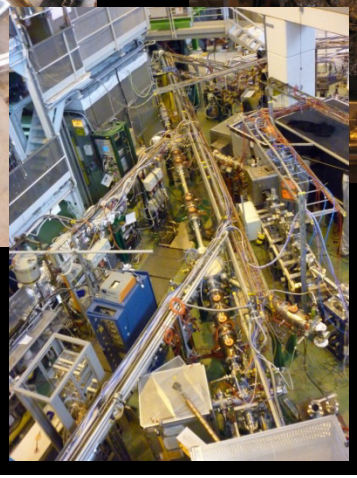

ISOLDE

IsolTrap

Praktikum vom 09.05.11 bis 20.05.11

Betreuerin: Dr. Susanne Kreim

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Mein Arbeitsplatz

- Isolde
- IsolTrap

Mein Praktikum

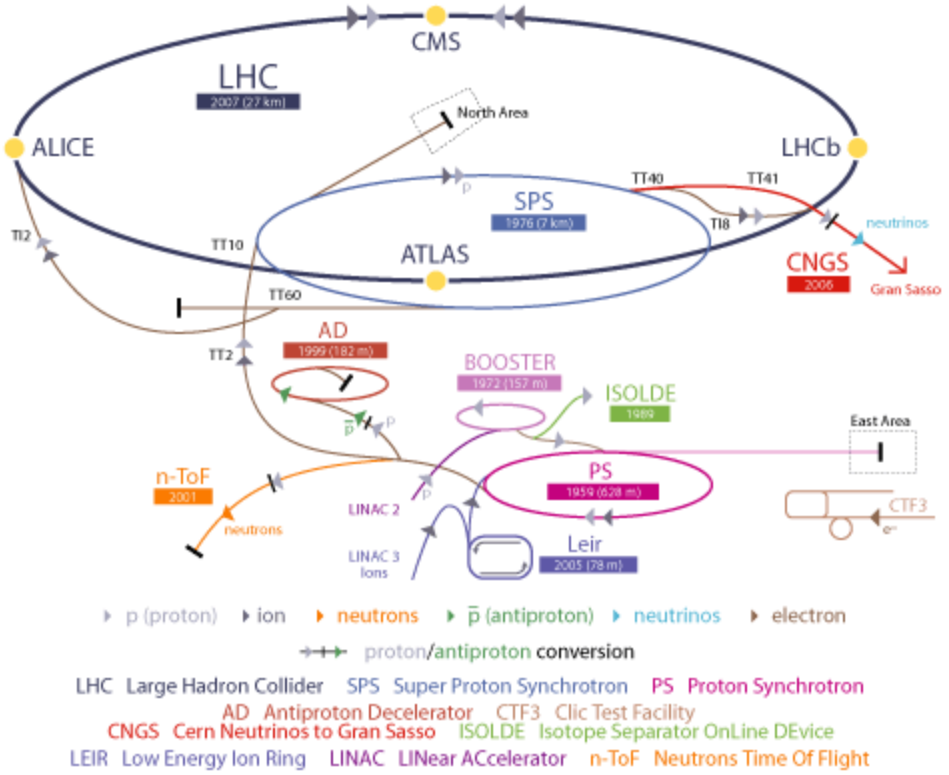
- An IsolTrap
- Sonstiges

Fazit

Isolde

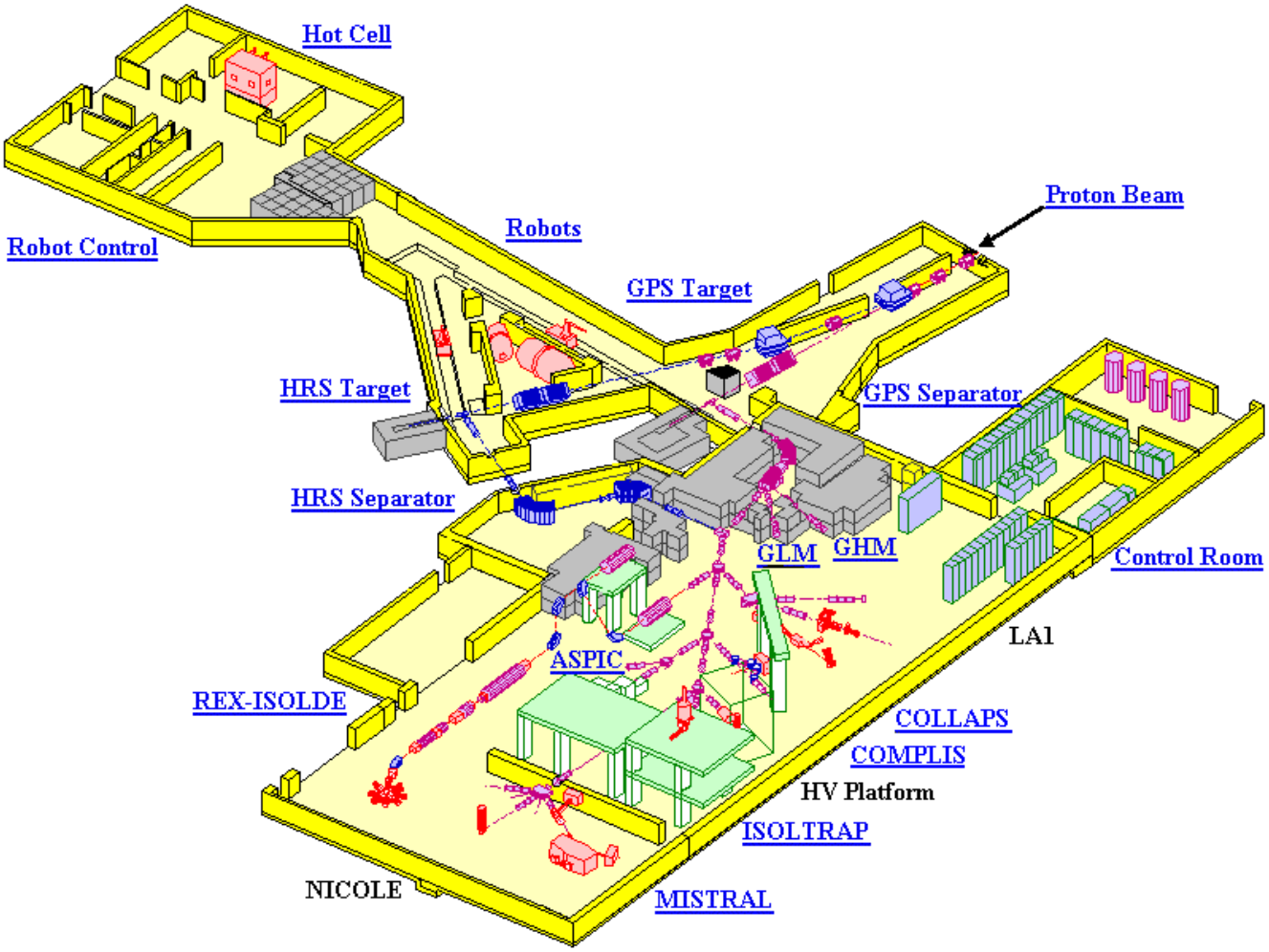
Mein Arbeitsplatz

CERN Accelerator Complex



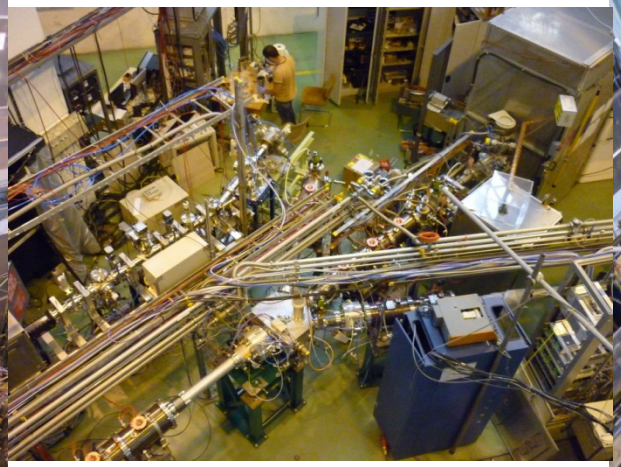
Isolde

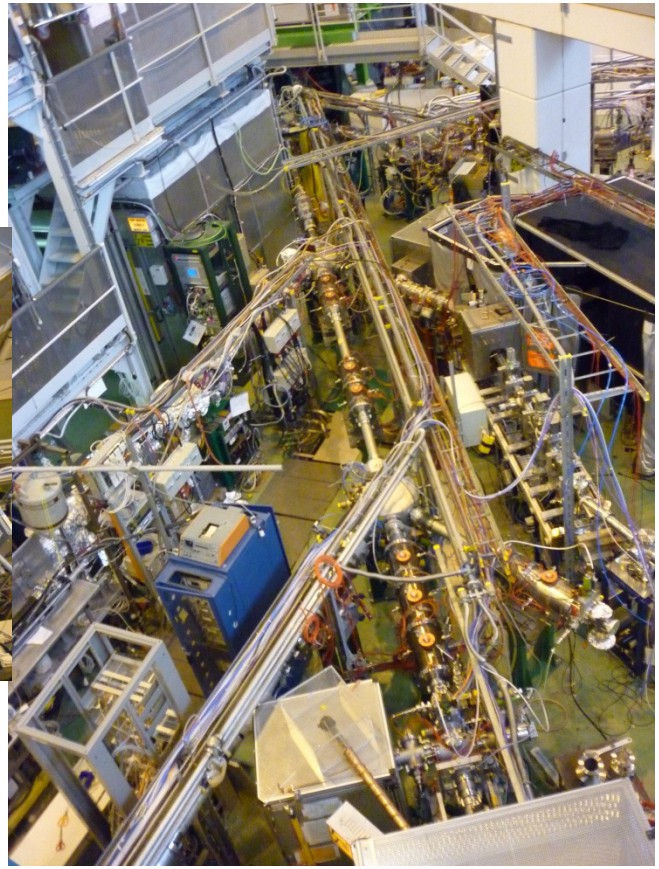
Mein Arbeitsplatz



Isolde

Mein Arbeitsplatz





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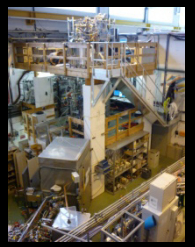
Mein Arbeitsplatz

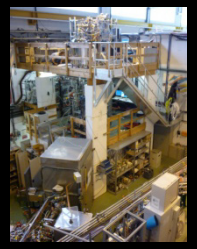


Was macht Isoltrap?

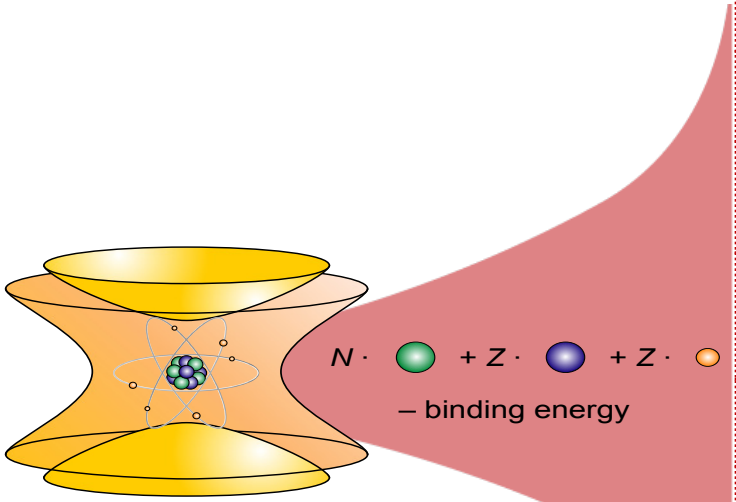
Präzisionsmassenmessungen an kurzlebigen Kernen

IsolTrap

Mein Arbeitsplatz



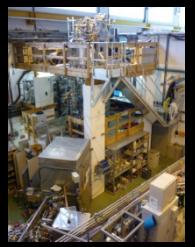
Warum Massen messen?



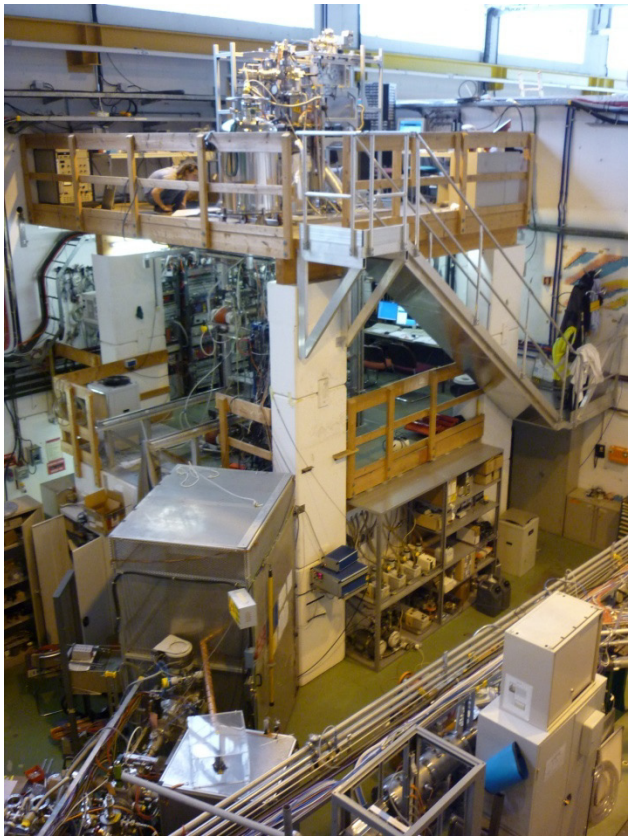
	δm/m
General physics & chemistry	$\leq 10^{-5}$
Nuclear structure physics - separation of isobars	$\leq 10^{-6}$
Astrophysics - separation of isomers	$\leq 10^{-7}$
Weak interaction studies	$\leq 10^{-8}$
Metrology - fundamental constants	$\leq 10^{-9}$
CPT tests	$\leq 10^{-10}$
QED in highly-charged ions - separation of atomic states	$\leq 10^{-11}$

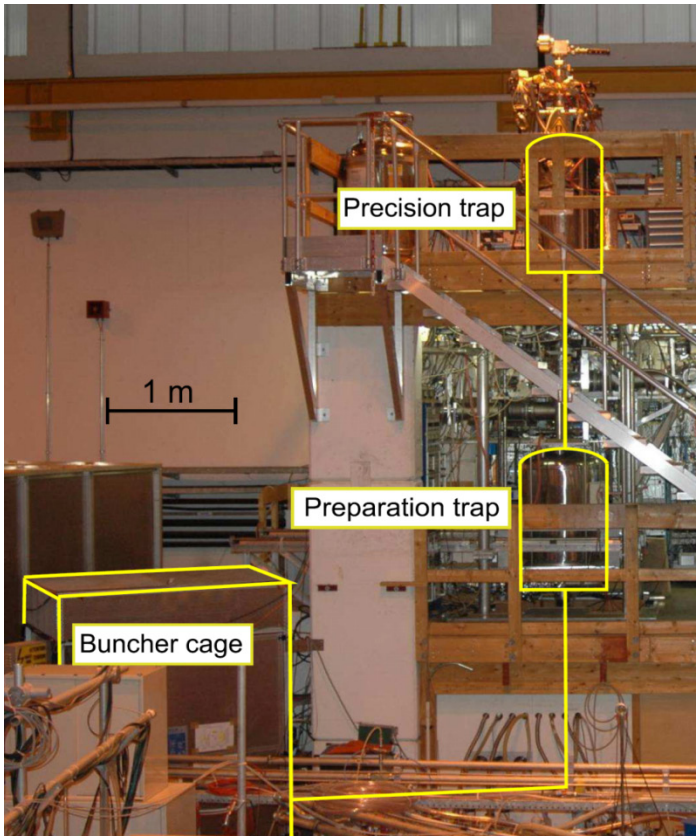
IsolTrap

Mein Arbeitsplatz



Aufbau:





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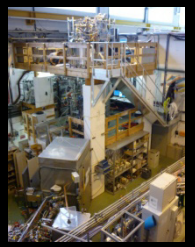
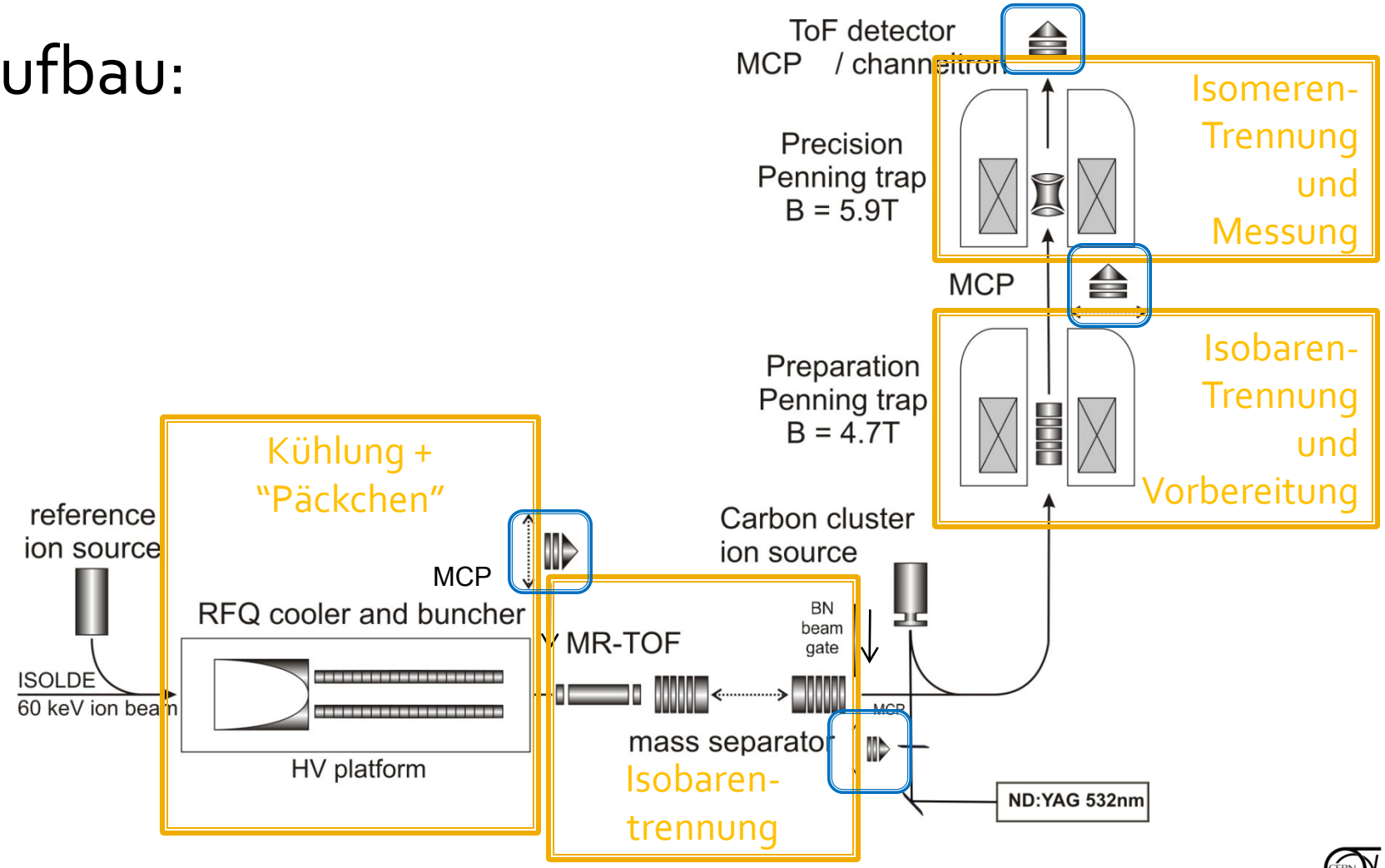
Mein Arbeitsplatz

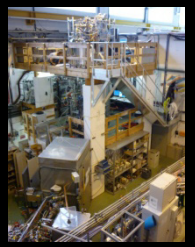


Aufbau:

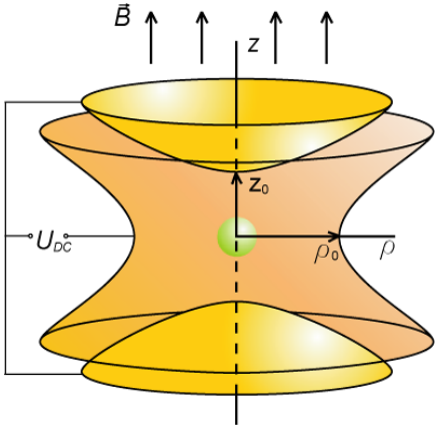


IsolTrap

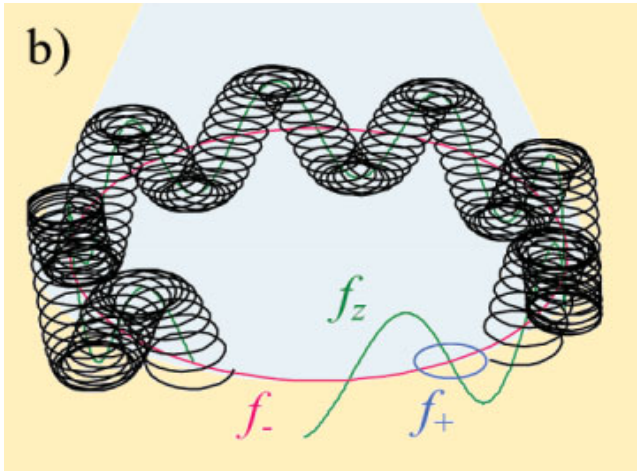
Mein Arbeitsplatz



Die Messung:



Penningfalle



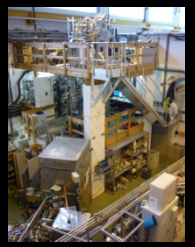
$$f_c = f_+ + f_-$$

massenabhänging
Quadropolanregung

massenunabhänging
Dipolanregung

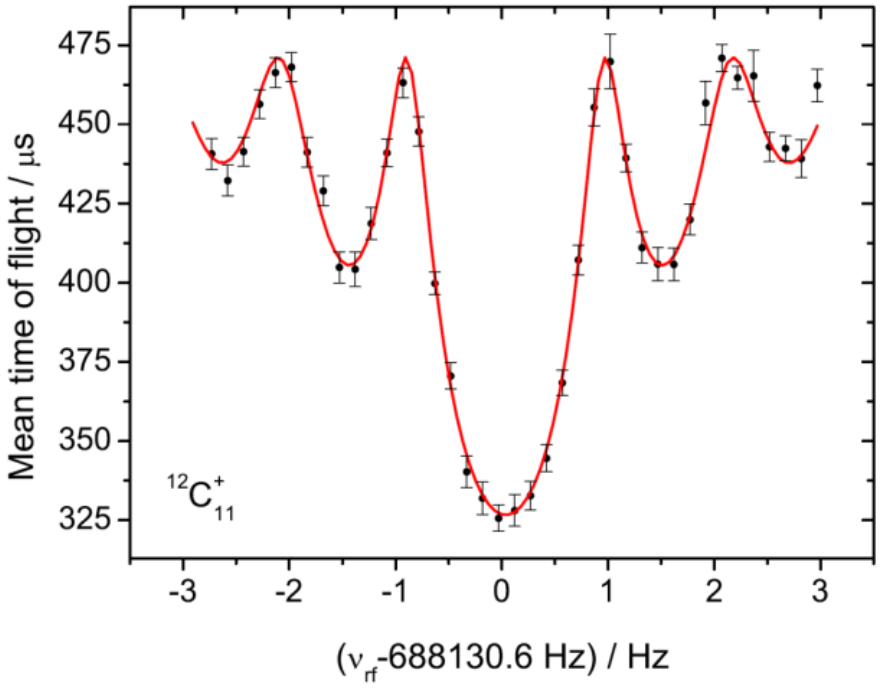
IsolTrap

Mein Arbeitsplatz



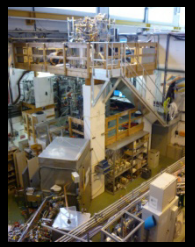
Die Messung:

$$\nu_c = \frac{1}{2\pi} \cdot \frac{q}{m} B.$$

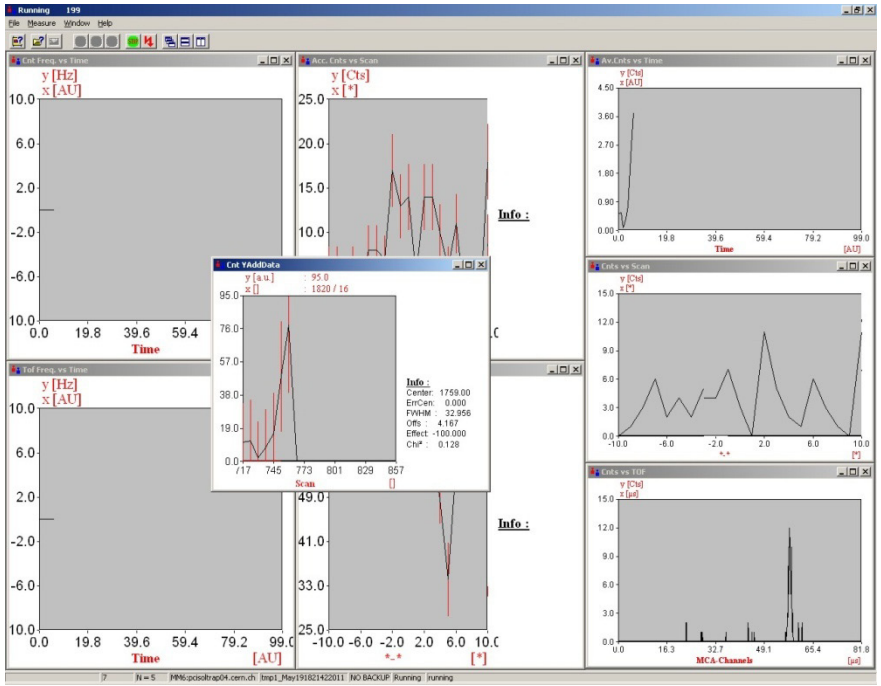


IsolTrap

Mein Arbeitsplatz

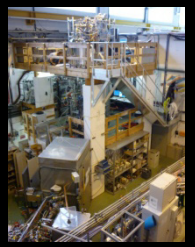


Am Computer:



IsolTrap

Mein Arbeitsplatz

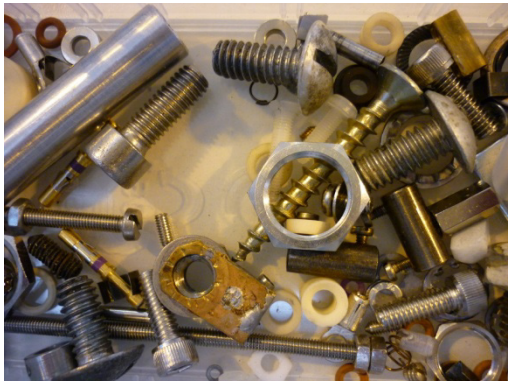


- Messung bei Kernen bis Halbwertszeit t = 60ms
- Dauer Messzyklus:
  - normal: ~ 900 ms
  - kürzeste: ~ 600ms
- Effizienz: ~ 1%

  → Produktionsrate: $10^3 \frac{ions}{s}$

Praktisches

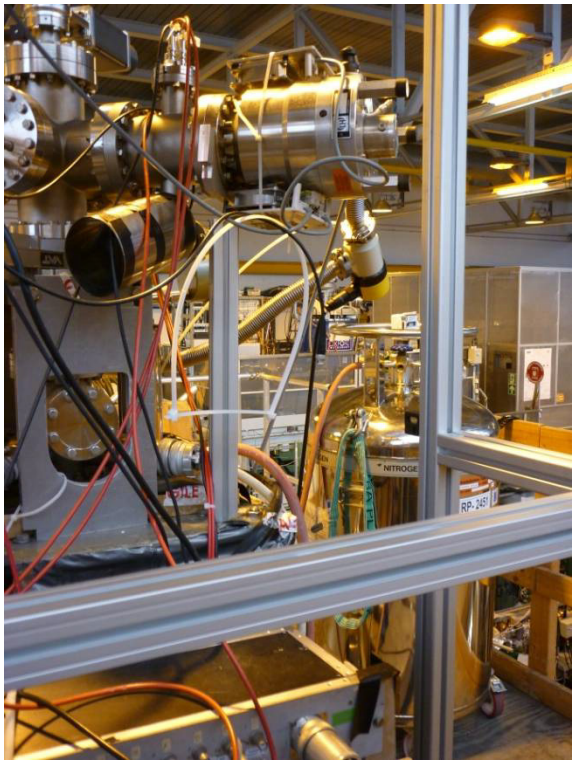
Mein Praktikum



Schrauben sortieren

Praktisches

Mein Praktikum

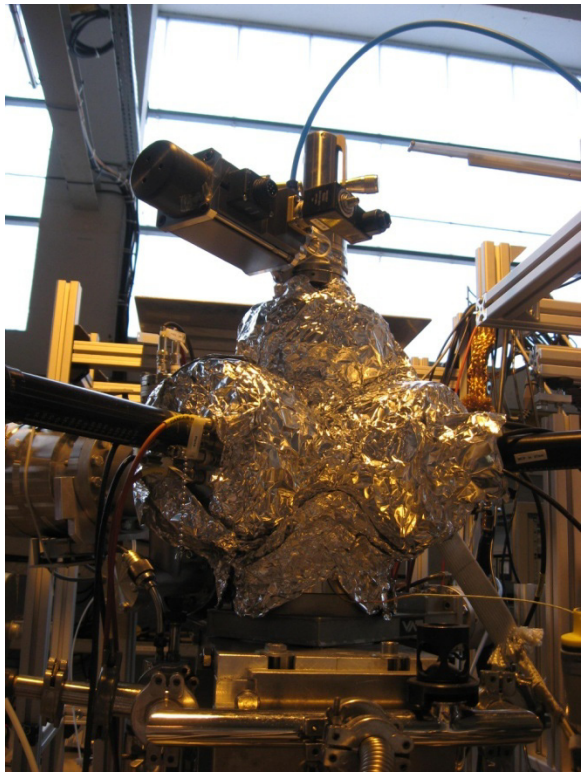


Konstruktions-
zeichnung

Konstruktion einer Haltevorrichtung für eine Pumpe

Praktisches

Mein Praktikum



Ausheizen

Praktisches

Mein Praktikum

Ausheizen

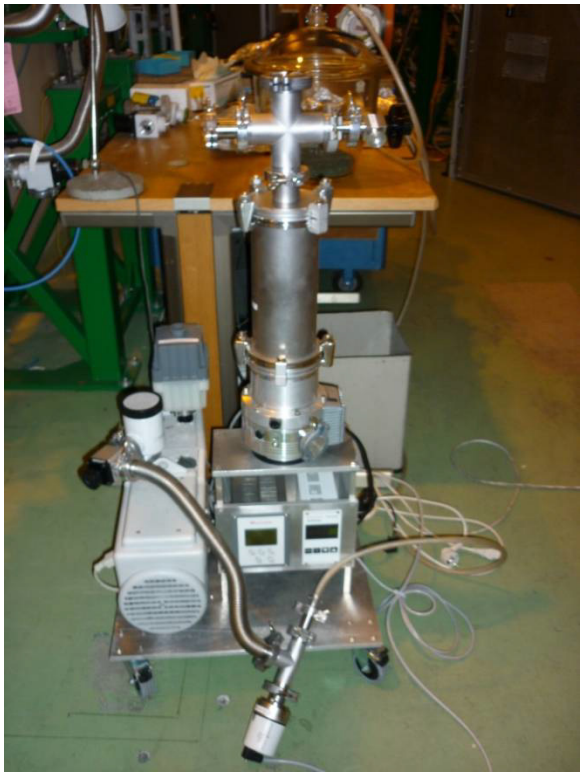
Praktisches

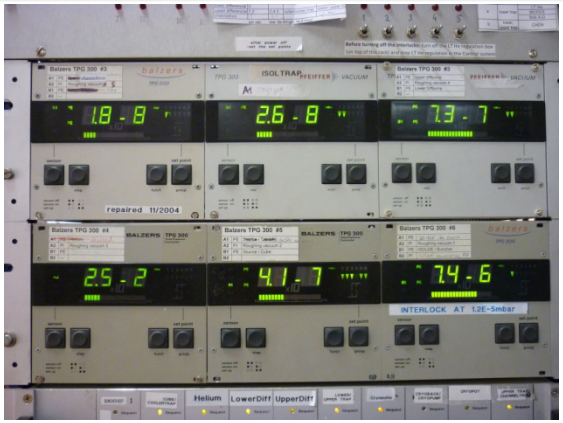
Mein Praktikum

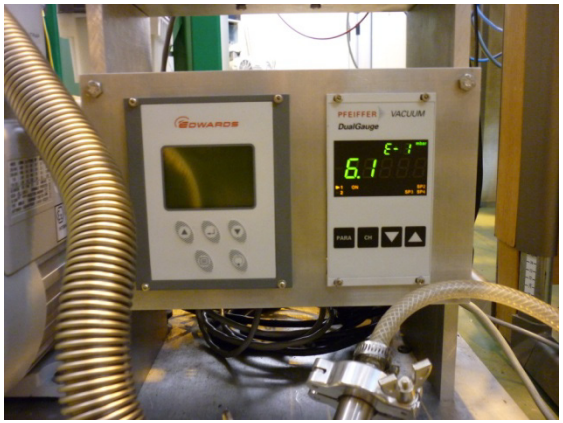
Exsikkator-Pflege

Praktisches

Mein Praktikum

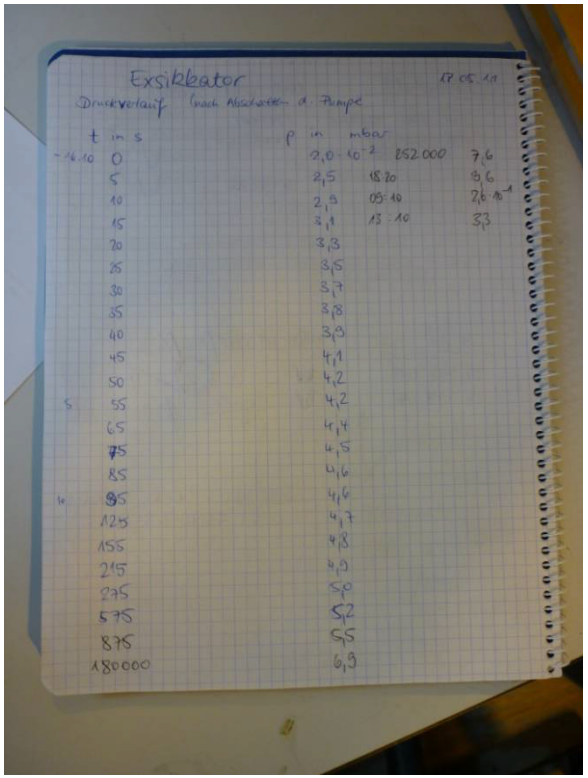


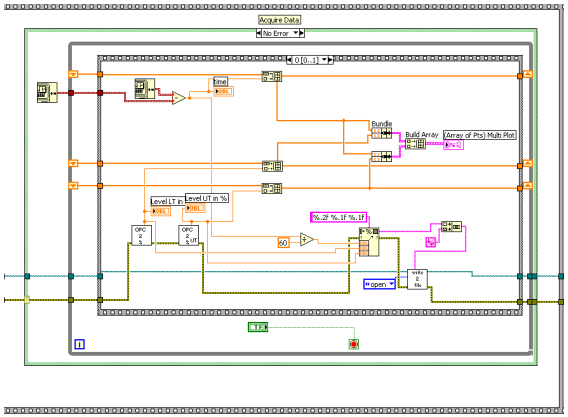




Druckverlaufmessung

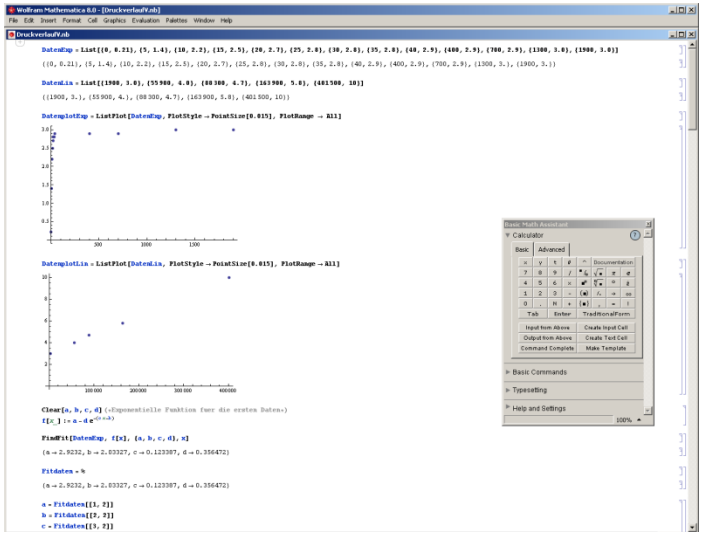
Computer Mein Praktikum



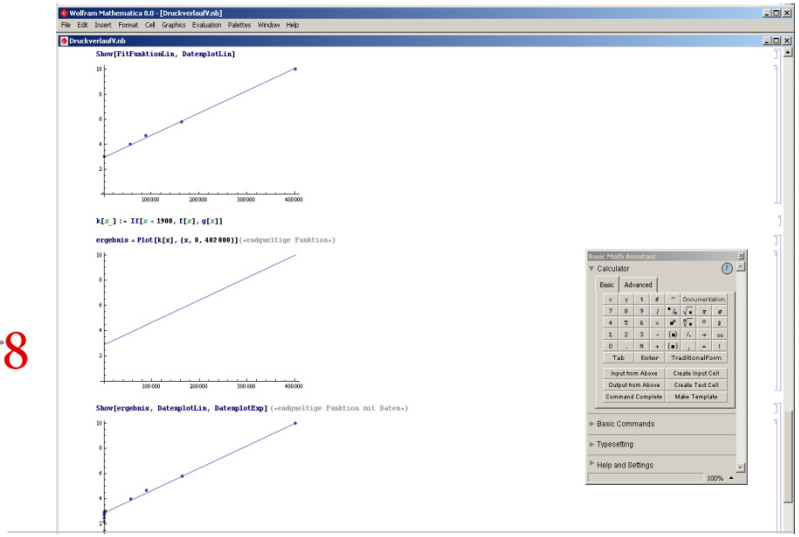


Druckverlaufmessung

Computer Mein Praktikum



Wolfram Mathematica 8



Mathematica

Computer

Mein Praktikum

- Bestellungen
- Kernphysik Vorträge

  bei Richard Casten (Yale University)
- Experimente

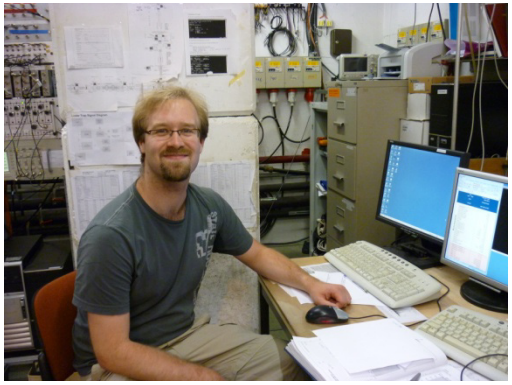
Sonstiges

Das Team

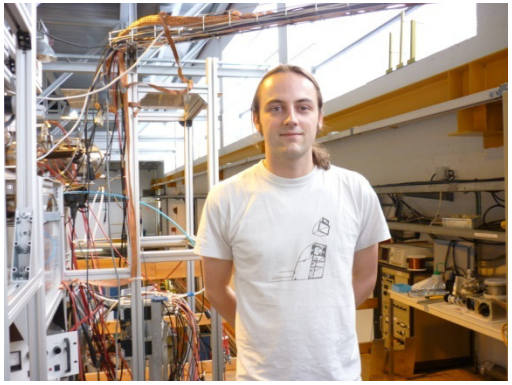
Mein Arbeitsplatz

Susanne

Marco



Christopher



Robert

Jonathan und Vladimir

Danke!

- **Susanne**
  für all die Zeit, Geduld und Mühe (und all die tollen Zeichnungen)
- Marco, Christopher und Robert
  für geduldige Erklärungen in allen möglichen Bereichen
- Jonathan und Vladimir
  für die gemeinsame Arbeitszeit und diverse interessante Unterhaltungen
- Rick Casten
  für die sehr verständlichen und geduldigen Erklärungen der Kernphysik
- dem gesamten ISOLDE-Team
  für die freundliche "Aufnahme"