

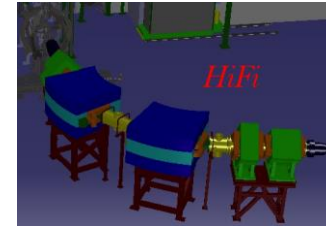


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HiFi

# Hie Isolde Fragment Identifier

Olof Tengblad & Joakim Cederkäll

ISCC 28th June 2016

## HIE-ISOLDE Spectrometer Workshop

10-11 March 2011  
Lund University  
Europe/Zurich timezone

Overview

Scientific Programme

Call for Abstracts

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### Scientific Programme



Speakers include: Wilton Catford, Surrey, Barry Davids, TRIUMF, Andres Gadea, Valencia, Thorsten Kroell, Darmstadt, Matteo Pasini, CERN, Mauricy Rejmund, GANIL, Jan Saren, JYFL, Thierry Stora, CERN, Juha Uusitalo, JYFL.

Action committee: O. Tengblad, J.Cederkall & W. Catford

Put on ice when the TSR projected started

Oct. 2013 O. Tengblad was asked by Yorik Blumenfeld to look into the possibility to move TRImuP to ISOLDE.

Discussion stalled due to re-organisation at KVI-CAR – RUG  
2015-16 retaken the contacts



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## Zero-degree spectrometer @ Hie- Isolde

Why a zero degree spectrometer:

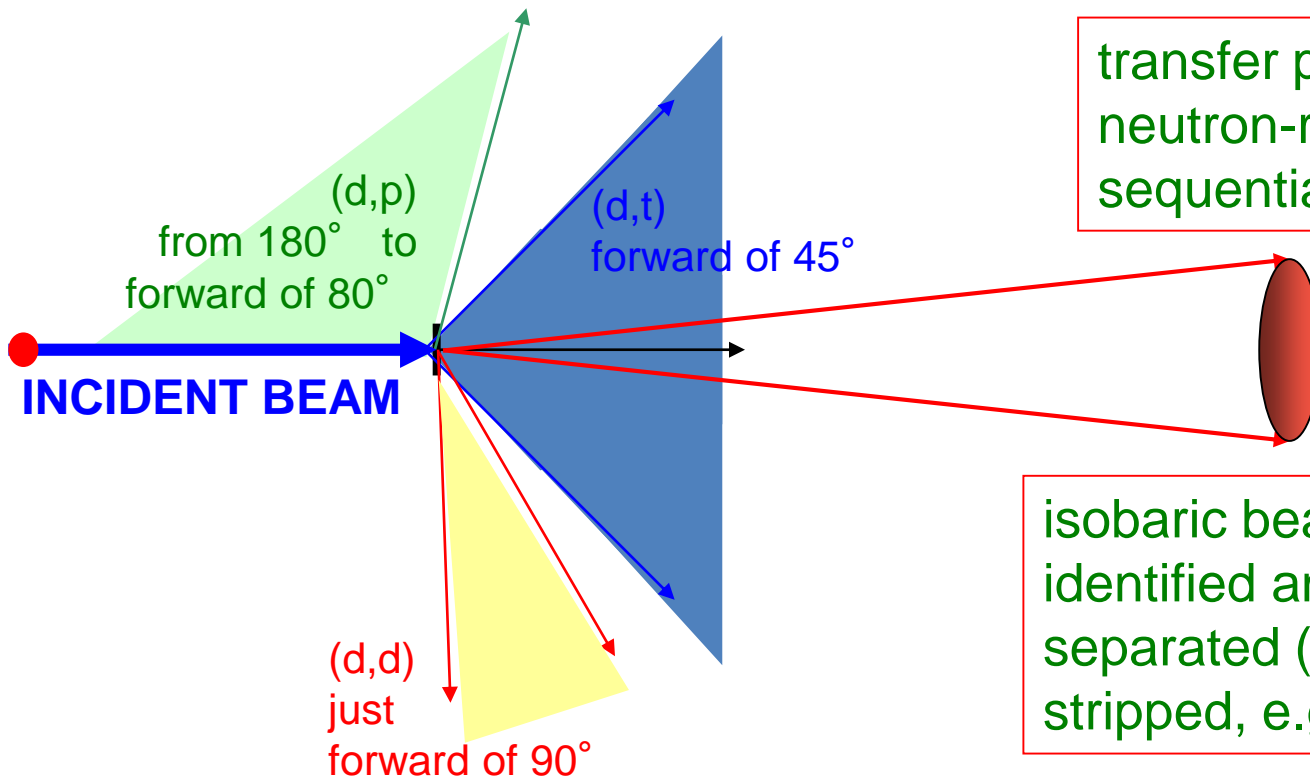
- identification of reaction products
- physical separation of isobaric beams or other beam contaminants

Design Parameters

- large enough angular acceptance to pick up sequential decay products
- excellent angular resolution to allow kinematic reconstruction – *missing momentum*

- 2011: 35 Lols for HIE-ISOLDE
- 15 claims to profit from spectrometer or separator
- mostly to identify beam-like particles
- 1 explicitly mentions the use of a spectrom. for reactions with light particles.
- most request the MINIBALL + CD or T-REX set-up
- **2016: 16 approved proposals would profit from a Spectrometer**

**USING RADIOACTIVE BEAMS in INVERSE KINEMATICS**



transfer products on  
neutron-rich side can  
sequentially n-decay

isobaric beams can be  
identified and/or physically  
separated (possibly further  
stripped, e.g.  $^{15}\text{N}^{3+}/^{21}\text{O}^{4+}$ )

fusion-evaporation  
products from reactions  
on C in  $\text{CD}_2$  targets

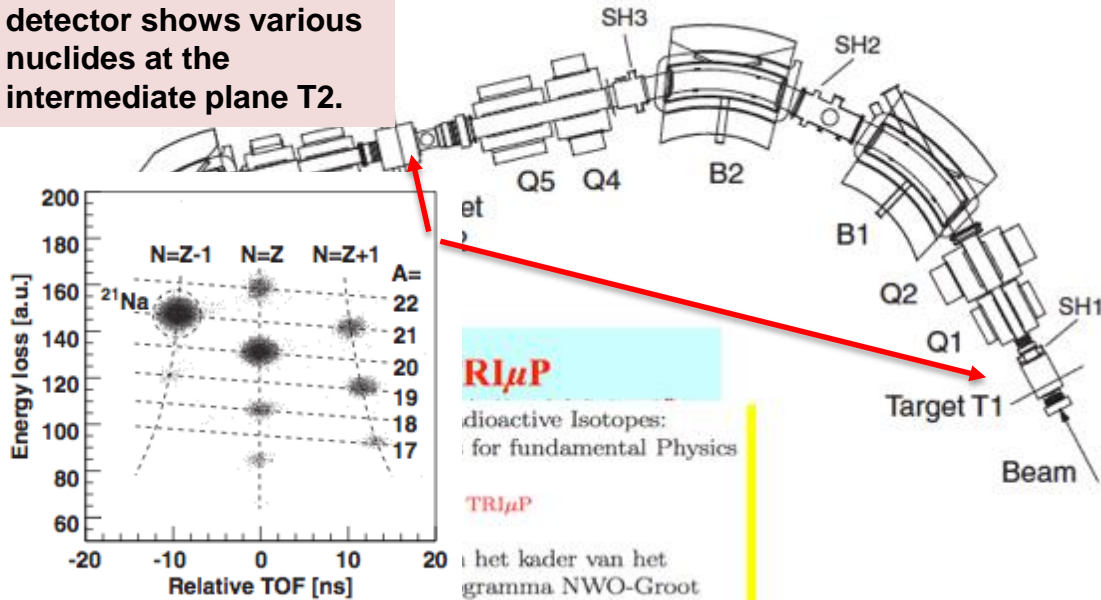
Existing machine not in use @ KVI-CAR Built 1994 Should be scrapped!?

Van Swinderen Institute for Particle Physics and Gravity, University of Groningen  
 Researchgroup Ions:

VSI interest at ISOLDE:

Radium isotopes for ATOMIC Fundamental Symmetries Studies (i.e. at low energy

Time of flight vs. energy loss in a 100 mm silicon detector shows various nuclides at the intermediate plane T2.



**RIμP**  
 radioactive Isotopes:  
 for fundamental Physics  
**TRIμP**  
 het kader van het  
 gamma NWO-Groot



People of the ions group



Klaus Jungmann (group leader)

Klaus Jungmann

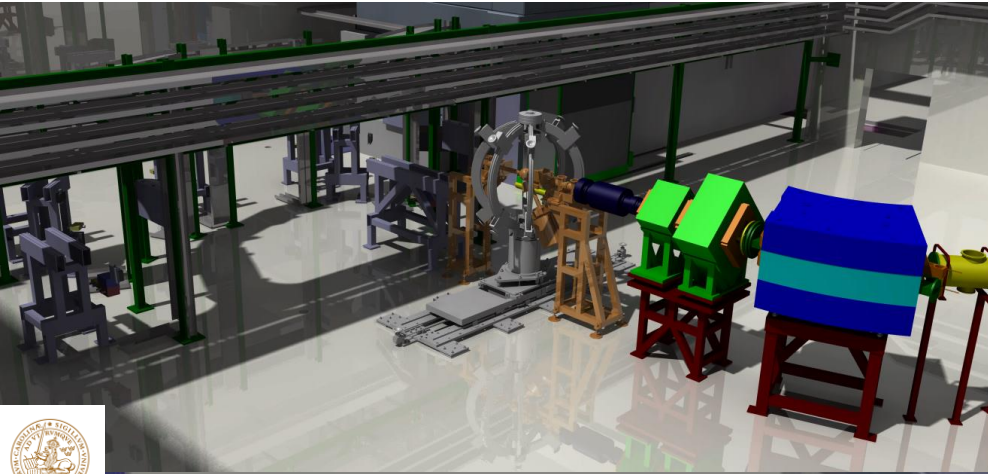


Lorenz Willmann (associate Professor)

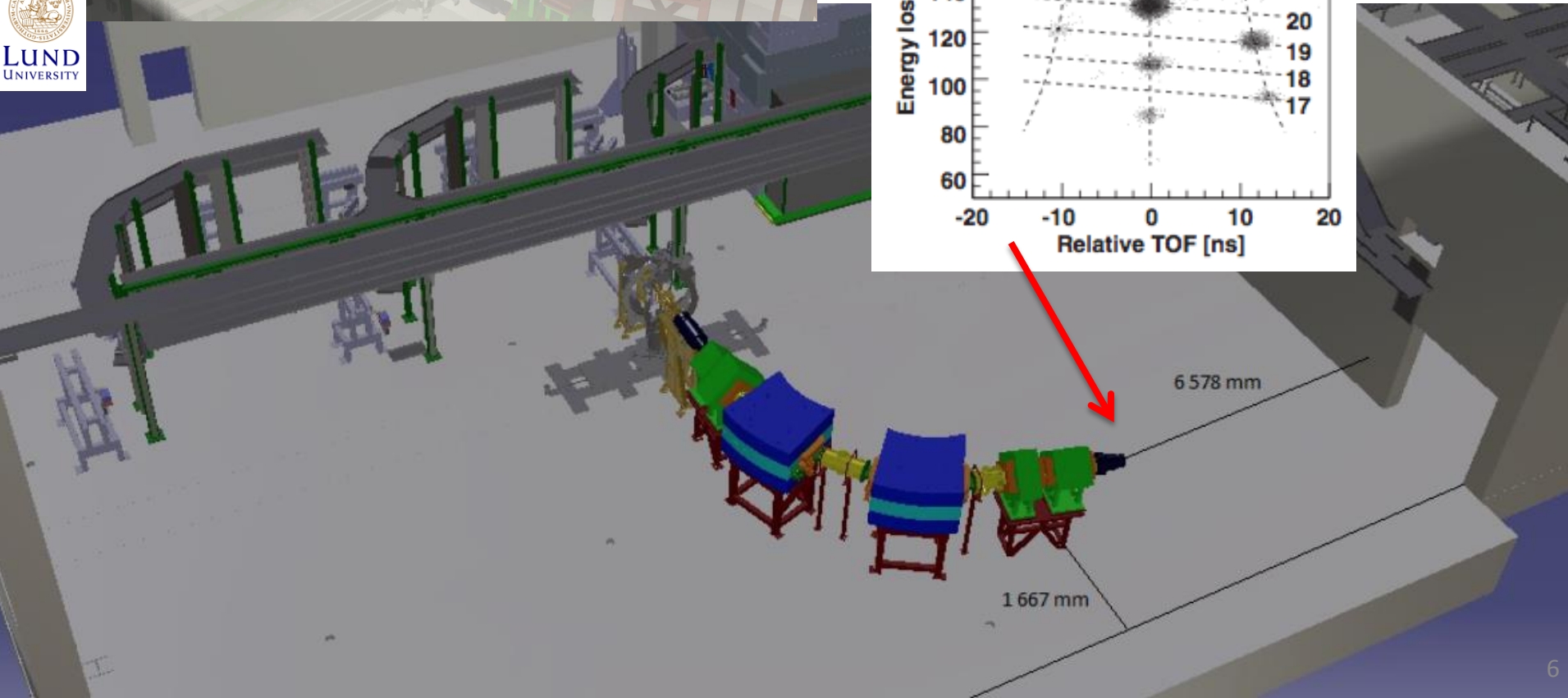
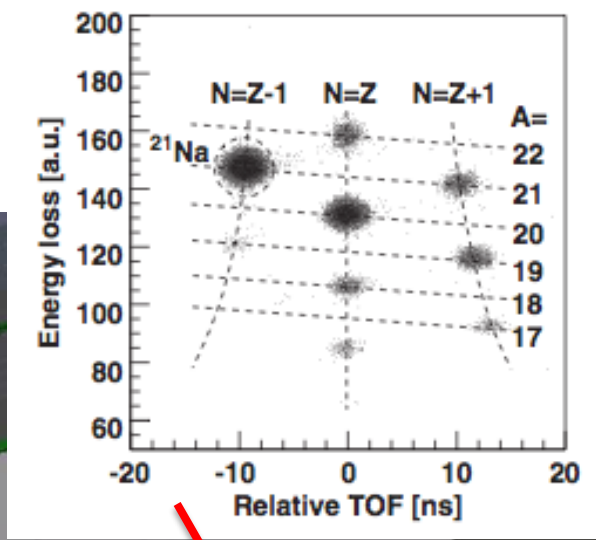
Lorenz Willmann

+ 4 PhD students

Item	cost (kEUR)	year
Recoil Separator	1715	2003
Initialization	25	2000
Dipole	250	2001
Q-doublet	400	
Power supplies	120	
Vacuum box	100	
Pumps, diagnostics	100	2002
Installation	720	
<b>Separator</b>	<b>1.7 M€</b>	



HiFi with MiniBall @ XT01  
Catia drawings exact dimensions



## *HiFi - the Hie isolde Fragment identifier*

TRImP as 0-degree spectrometer at HIE-ISOLDE

Minutes meeting at RUG/VSI 15.04.2016

Present: **RUG/VSI** -- Klaus Jungmann, Lorenz Willmann, Hans Wilschut,  
**ISOLDE** -- María José García Borge, Joakim Cederkall, Olof Tengblad

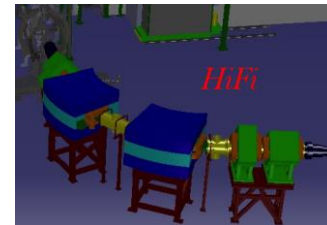
### Move and installation at CERN

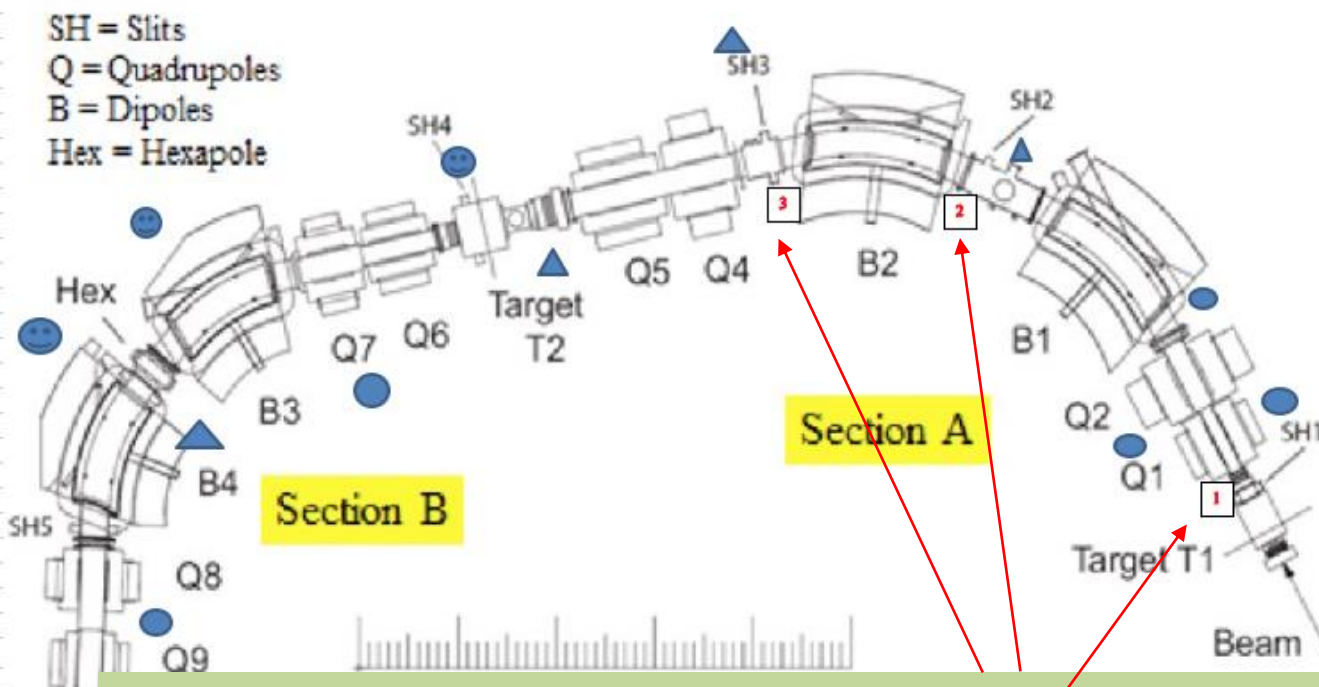
#### 2016:

- Power-supplies exist already at CERN as a donation from LUND University.
- Dismount at KVI-CAR and transported to CERN Oct. – Dec.
- The equipment will first be mounted at CERN in building B180.

#### 2017 B180 CERN:

- Where all the tests of vacuum, power supplies etc. will be performed.
- The detection system, will consist in a row of Double sided Si strip detectors this will be mounted and tested with alpha source and if possible to mount an external ion-source.





### Survey of activity

A first survey was made along the separator. The main activity are located at the primary target (1) and the frequently used slit SHT2 right (2). The background in the room is about 50-200 nSv/h allowing only reliable measurements above that value. At location (3) some activity was found.

**The remaining separator did not show any activity..**

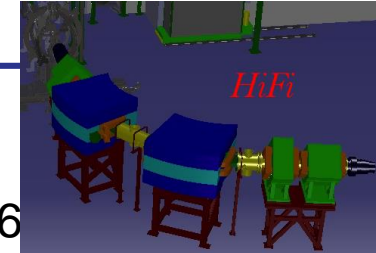
Summary of activity:

1. The exit and entrance of the gas cell inside chamber T1 was 12 $\mu$ Sv/h, at various places outside the cell were mostly a background level with some points 0.4 -0.5 12 $\mu$ Sv/h, where the target is nearby.
2. Near slit SHT2 6-7  $\mu$ Sv/h along the intermediate chamber 0.2-1  $\mu$ Sv/h.
3. Exit vacuum box BT2 1  $\mu$ Sv/h



## *Phases of the ISOLDE HiFi Separator Project*

### ***Timeline and Milestones***



#### **Phase A**

1 January 2016 to 31 December 2016

2016: Identifying radioactive and non-radioactive components of the TRIMUP separator. Preparation for and transport of non-radioactive components to CERN and installation in test area.

#### **Phase B**

1 January 2017 to 31 July 2018

2017-2018: Testing hardware for the HiFi separator, including cooling and power, in test area at CERN. Installation of new detector systems and tests of these.

#### **Phase C**

1 August 2018 to 31 July 2019

2018-2019: Installation in ISOLDE experimental area and in situ testing