

LYCCA Commissioning (S363) Towards PRESPEC & HISPEC

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on behalf of the LYCCA & PRESPEC Collaborations

S363:
Approved in March 2008
30 shifts PARASITIC

FRS Users-Workshop, October 2009

- What are PRESPEC & LYCCA?
- Readiness of LYCCA-0 (S363)
- Plans & Wishes

Nuclear structure at GSI by means of γ -ray spectroscopy:

Excerpt from the Memorandum of Understanding:

"PRESPEC is a collaborative European project ... to construct and operate detector set-ups at the SIS/FRS facility at GSI for nuclear spectroscopy. It builds upon the successful RISING project and will employ equipment that was used in RISING as long as is appropriate. It is also aimed at preparing for the spectroscopy to be carried out with HISPEC and DESPEC at NUSTAR/FAIR by commissioning and employing components developed for HISPEC/DESPEC already at the SIS/FRS facility. It is also intended that AGATA detectors will be used at the SIS/FRS facility as part of PRESPEC."

LYCCA — the Lund-York-Cologne CALorimeter

Identification of reaction products in HISPEC-DESPEC@NuSTAR

- Core device for the HISPEC program.
- Identification of secondary reaction products by A and Z at 50-200 MeV/u via
 - ΔE , x , y (DSSSD),
 - E (CsI),
 - Time of flight (CVD diamond *et al.*).
- Modular, flexible system to be used in different configurations.

FAIR PAC NUSTAR
FAIR TAC HISPEC/DESPEC

Technical Report, V1.2, June 2008

LYCCA — the Lund-York-Cologne CALorimeter

Identification of reaction products in HISPEC-DESPEC@NuSTAR

**FUNDING SECURED
in Germany, Sweden, and the UK!**

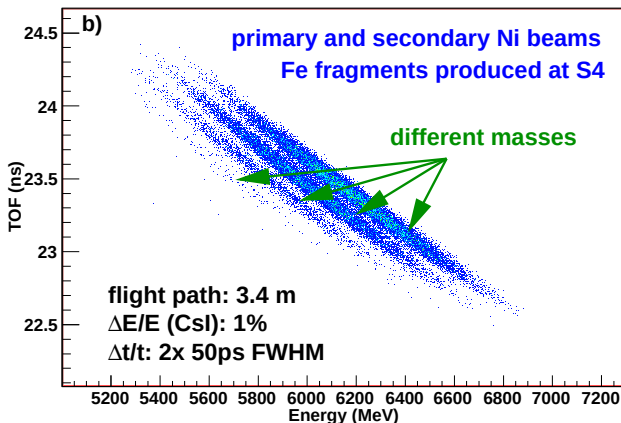


**... complete subsystem of LYCCA ($\sim 40\%$)
for PRESPEC in-beam campaign (2010–2012),
including AGATA-PRESPEC experiments!**

Main limitation is the number of electronics channels, cf. AIDA.

AIM: ToF and Total Energy vs. Mass Resolution

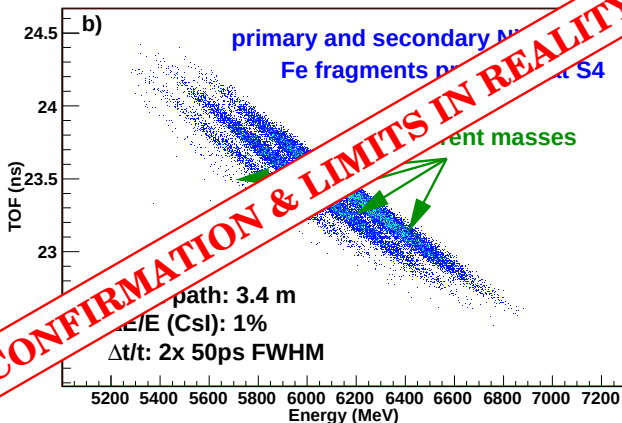
MOCADI simulation for beam profile and secondary reaction at S4 coupled to GEANT4 simulation of LYCCA-0



M.J. Taylor et al., NIM A606, 589 (2009)

AIM: ToF and Total Energy vs. Mass Resolution

MOCADI simulation for beam profile and secondary reaction
at S4 coupled to GEANT4 simulation of LYCA



M.J. Taylor et al., NIM A606, 589 (2009)

READINESS: 1. Mechanics

- **LYCCA chamber:**
READY (University of Cologne)
- **Connection to S4 target area:**
Until 12/2009 (GSI)
- **Installation at S4:**
See plans & wishes

- **Preamplifiers:**

- 128 channels Csl: existing

- 448 channels Si: ordered, delivery 12/2009

- ~ 20 channels diamond: existing/ordered

- **Main electronics:**

- 576 channels STM16+: existing

- ~ 50 channels fast timing CFDs: existing

- **DAQ:**

- 576 channels CAEN 785 ADC and 775/767 TDCs: existing

- 2x 1290A TDCs: existing

- **Cabling at S4:**

- See plans & wishes

- **LYCCA-Modules:**

4 modules (1 DSSSD plus 9 CsI crystals): **READY**

10 modules under construction: ready by $\sim$ 04/2010

- **ToF Stop:**

Large area fast plastic: **READY**, $\Delta t/t < 30$ ps!

- **ToF Start:**

3x3 element pCVD diamond:

prototype in beam 09/2009, complete array by 02/2010.

PLANS & WISHES

- **10/2010–03/2010;**
Preparations LYCCA-0 commissioning (S363):
Completion of mechanics and electronics.
LYCCA-related DAQ-software developments.
Cabling and (long-term) preparations at S4.
- **03/2010–05/2010; Run S363 at S4**
Parasitic to long experiments – but access to S4
Any light beam ($A \leq 80$) is suitable;
(^{48}Ca or ^{64}Ni , cf. UNILAC during that period, ^{40}Ar , any Kr, ...
Standard FRS detectors.
- **05/2010–08/2010; Preparations PRESPEC**
Derive LYCCA-0 mass resolution with highest priority.
Optimisation of DAQ-software for PRESPEC.
Prepare physics cases for PRESPEC-AGATA-(LYCCA) phase.
- **08/2010–10/2010; Run ~ 14 days PRESPEC exps.**
See next presentation.