

ADUC and ELENA Meeting

28-29 September 2011

Sept. 29, 2011 | Rudolf Maier

Outline

Introduction

HESR: **H**igh-**E**nergy **S**torage **R**ing



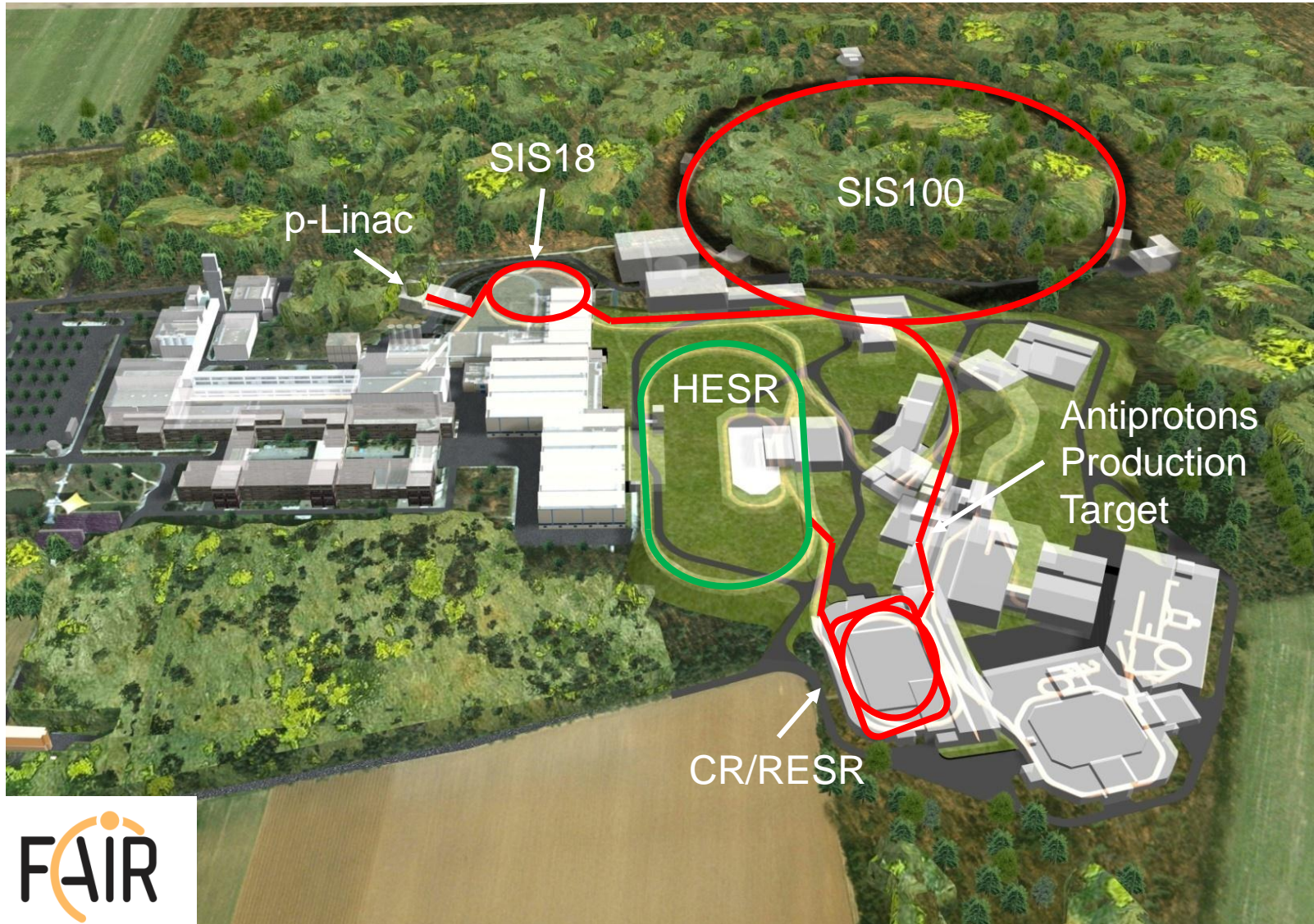
Prototyping of HESR components

Beam Experiments at the Cooler Synchrotron **COSY**

Summary

Contribution to **ELENA**

Facility for Antiproton and Ion Research

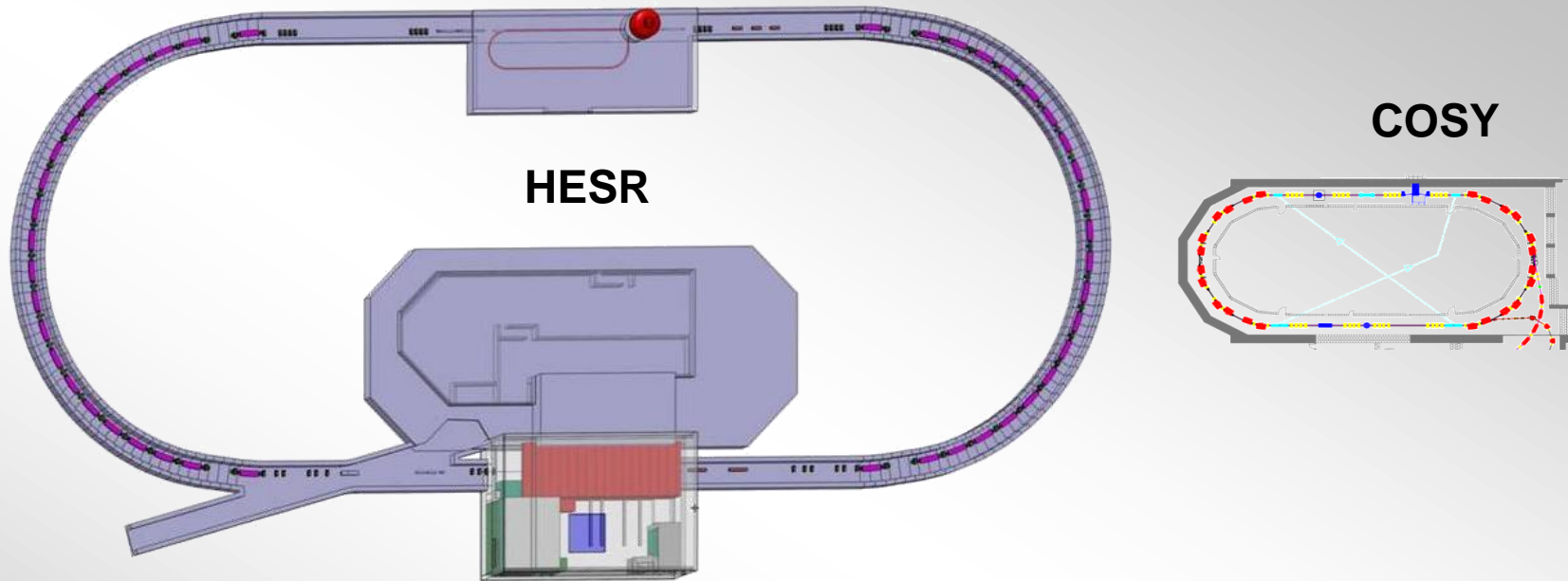


Criteria for the Layout of the HESR

HESR design driven by the requirements of PANDA:

- Antiprotons with $1.5 \text{ GeV}/c \leq p \leq 15 \text{ GeV}/c$
- High luminosity:
 - Thick targets: $2 \cdot 10^{32} \text{ cm}^{-2}\text{s}^{-1}$
 - $4 \cdot 10^{15} \text{ cm}^{-2}$
- High momentum resolution: $\Delta p/p \leq 4 \cdot 10^{-5}$
 - Phase space cooling
- Long beam life time: $>30 \text{ min}$

HESR with PANDA and Electron Cooler

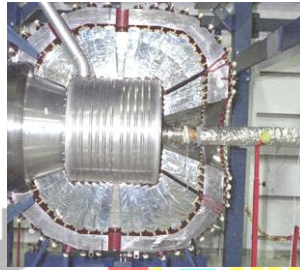


HESR		COSY
575 m	Circumference	184 m
1.5 – 15 GeV/c	Momentum	0.3 – 3.7 GeV/c
up to 9 GeV/c	Electron Cooling	up to 0.5 GeV/c
Full range	Stochastic Cooling	1.5 – 3.7 GeV/c

HESR Consortium: Germany (Jülich, GSI, Mainz), Romania and Slovenia

HESR Prototyping and Tests

Pellet Target



100 KeV e-Cooler



WASA

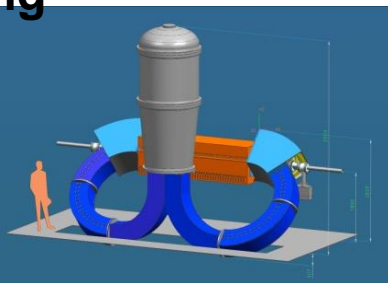


Barrier Bucket Cavity

Stochastic Cooling

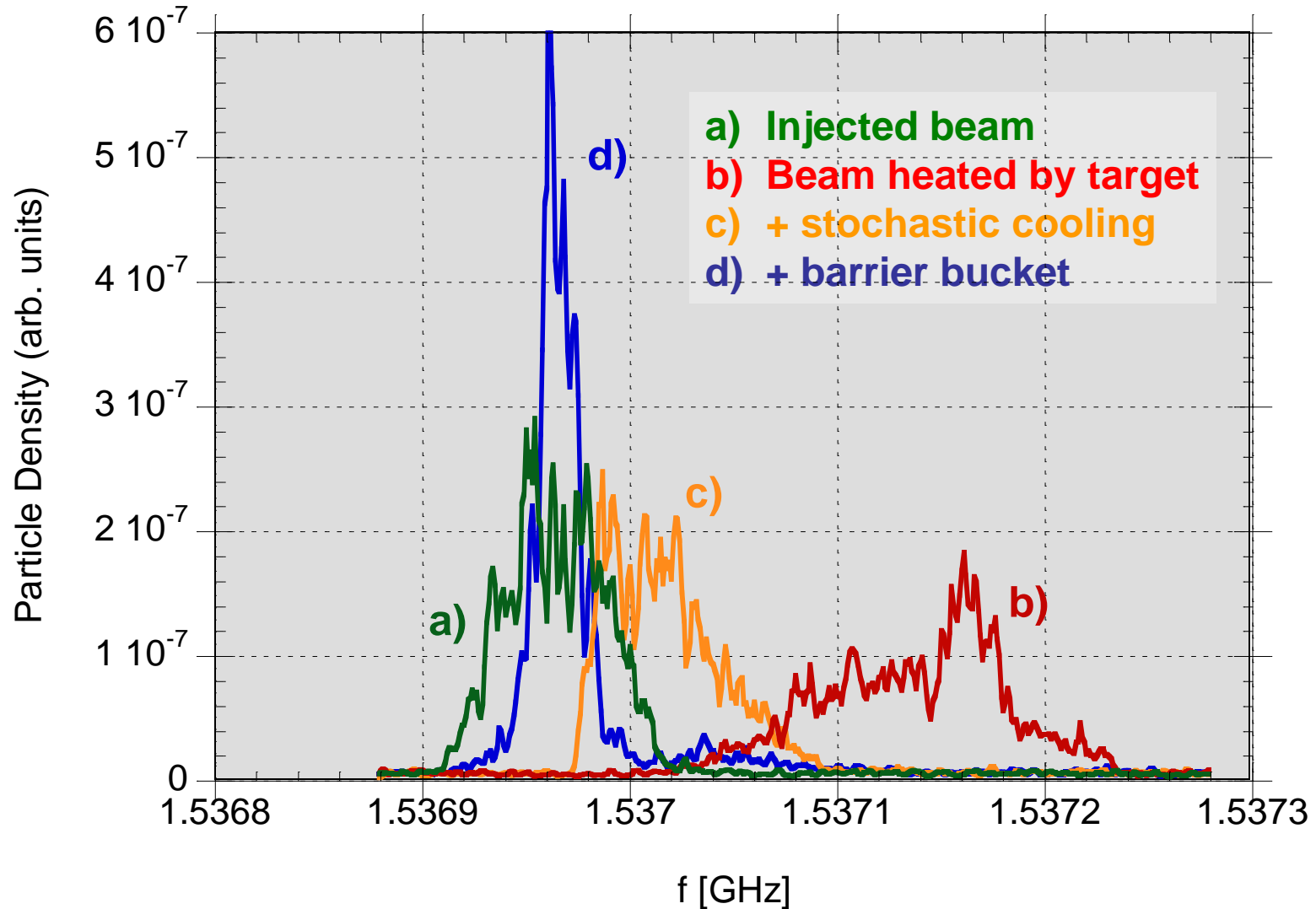


**Residual Gas
Profile Monitor**



2 MeV e-Cooler

Example: Beam Cooling with WASA Pellet Target



Summary

Hadron Physics with Antiprotons

- Sophisticated accelerators
- Forefront beam cooling
- Internal targets
- RF manipulation techniques

Contribution to ELENA

IKP at the research center Juelich has a long standing tradition of significant contributions to the facility and physics program at the CERN-AD.

We fully support constructing the ELENA ring to increase the phase space density of the cooled antiprotons.

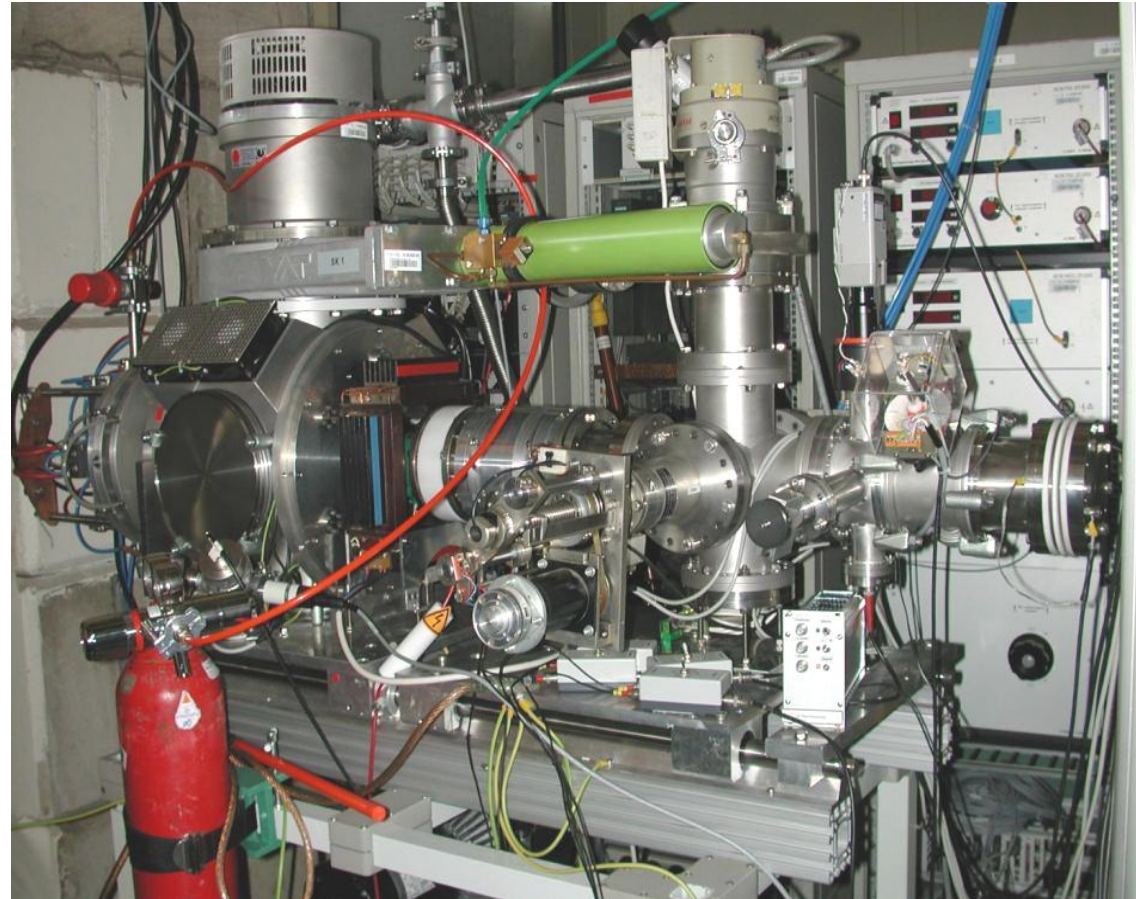
Contribution to ELENA

In the application phase of ELENA we have agreed to contribute the equivalent of 3 person-years to the construction efforts, and now that ELENA has been approved, we remain dedicated to this pledge.

Currently our electronic and mechanical workshops are fully booked, however we are happy to discuss workpackages that match the time schedules, as well as other contributions that require other resources.

Contribution to ELENA

H⁻ Source



Running H⁻ Sources since 1995 for Injection into Cyclotron

COSY Cycle for spin-filtering at 49.3 MeV

