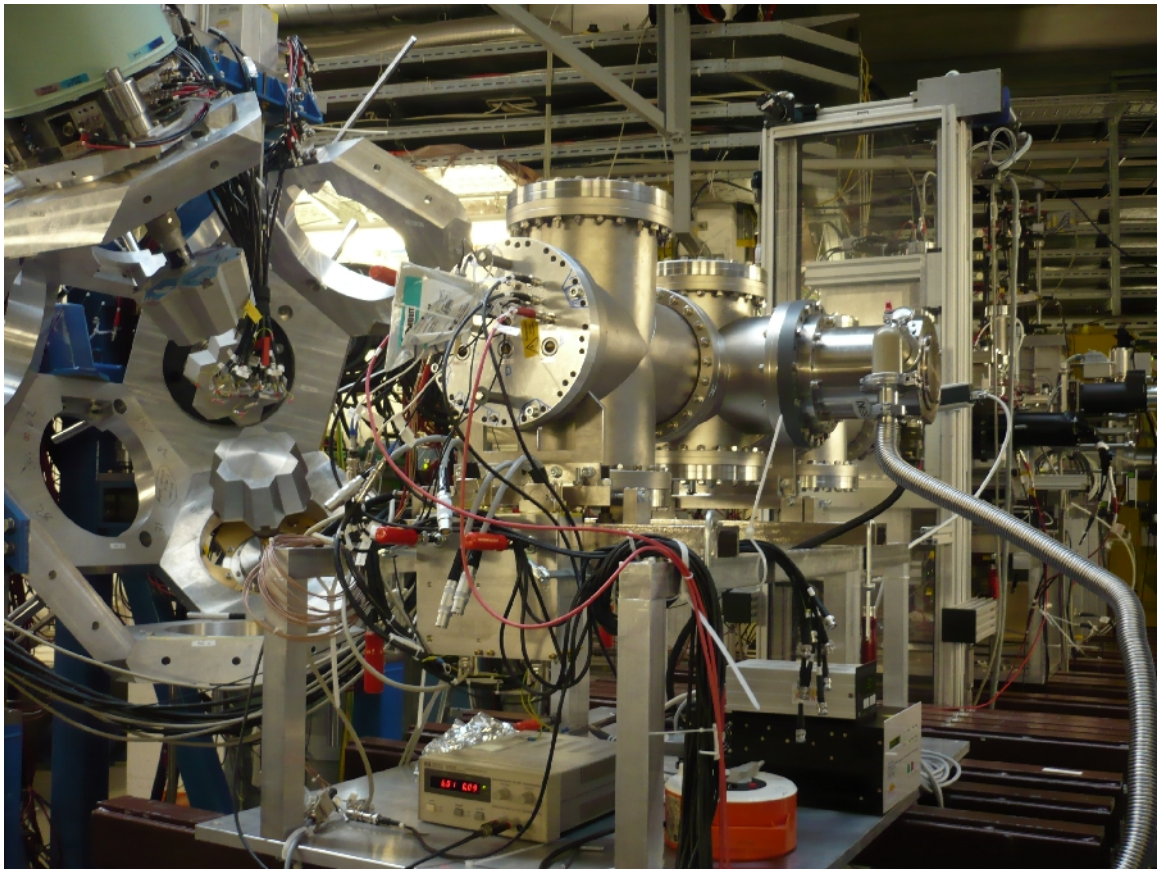
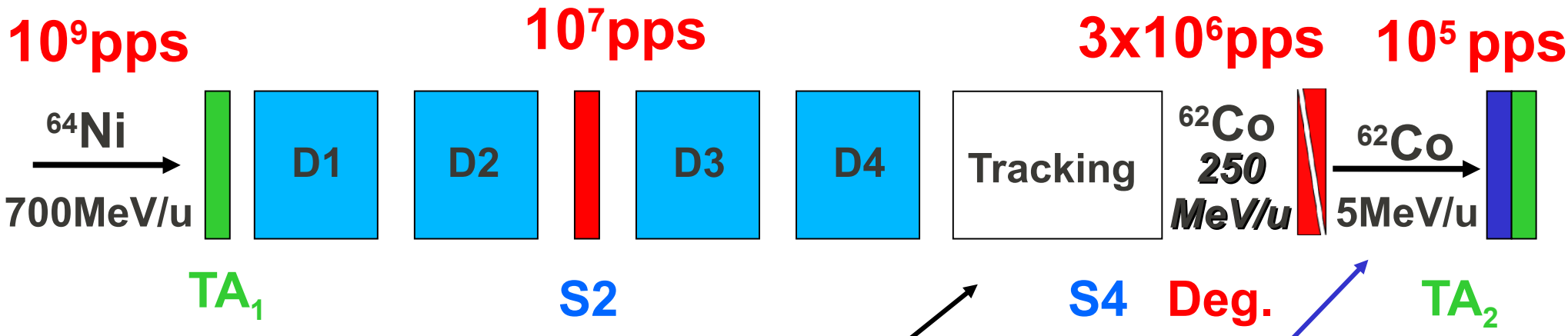
Results from the slowed down beams projects at GSI

F.Naqvi
University of Cologne

- Principle
- Proposed solution
- Test experiments



Slowed down beams projects and FRS



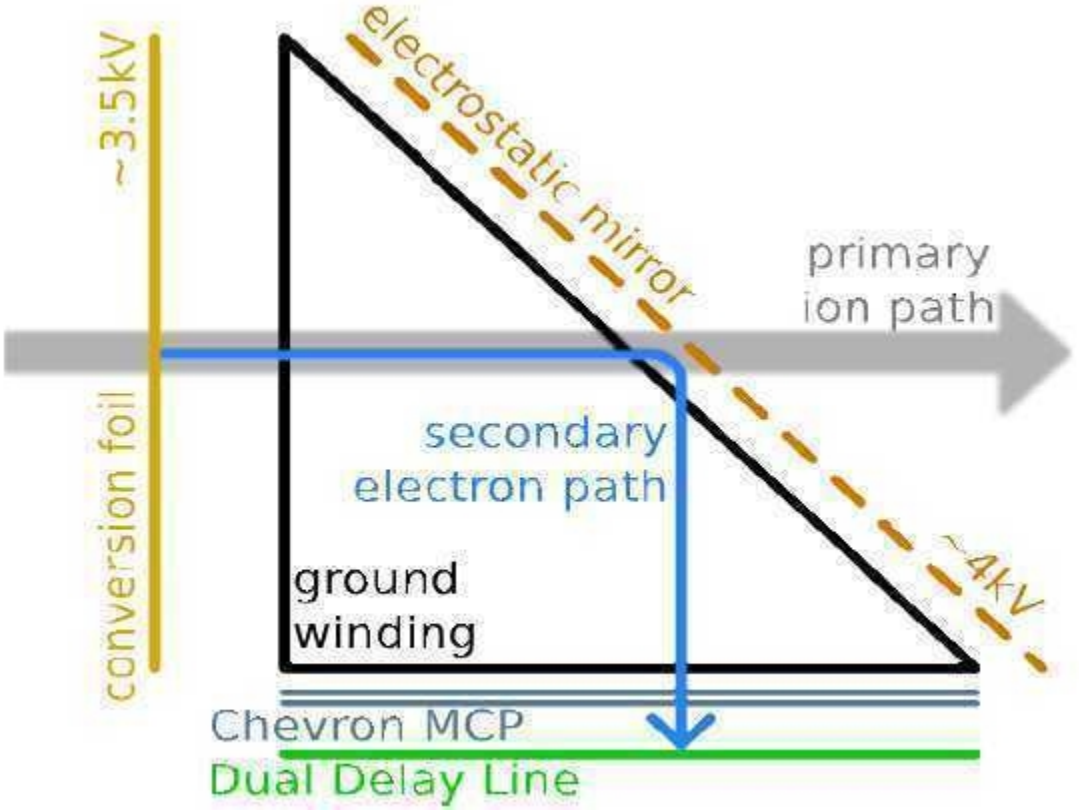
Track the trajectory of each particle before slowing down

- Track the trajectory of each particle after slowing down
- Identify the energy of each particle before the secondary target

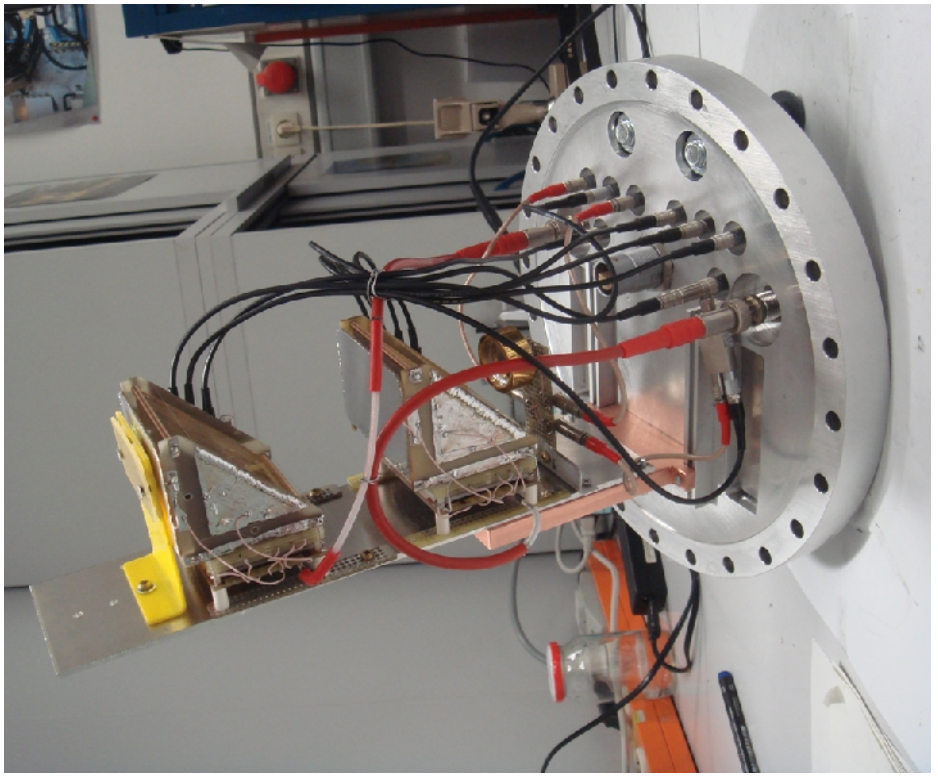
HIC for FAIR
Helmholtz International Center

GSI

MicroChannel Plate (MCP)



Design:N.A. Kondratjev(JINR)



4 x 6 cm, 1.5 μm Mylar foil

$\Delta T(FWHM) \sim$ **140 ps**

$\Delta X_{\alpha}(FWHM) \sim 3$ mm

$\Delta X_{fr}(FWHM) \sim 1.5$ mm

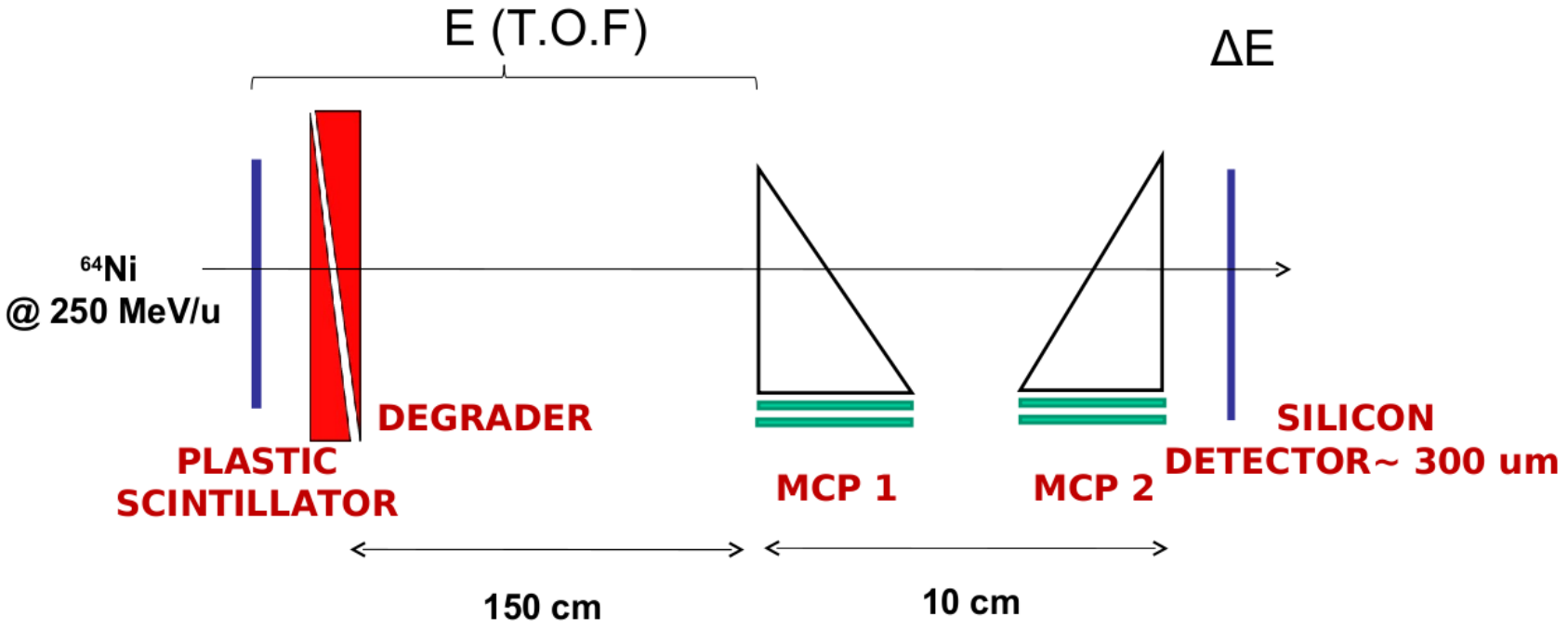
$\varepsilon_{\alpha} \sim 85\ \%$

$\varepsilon_{fr} \sim 100\%$

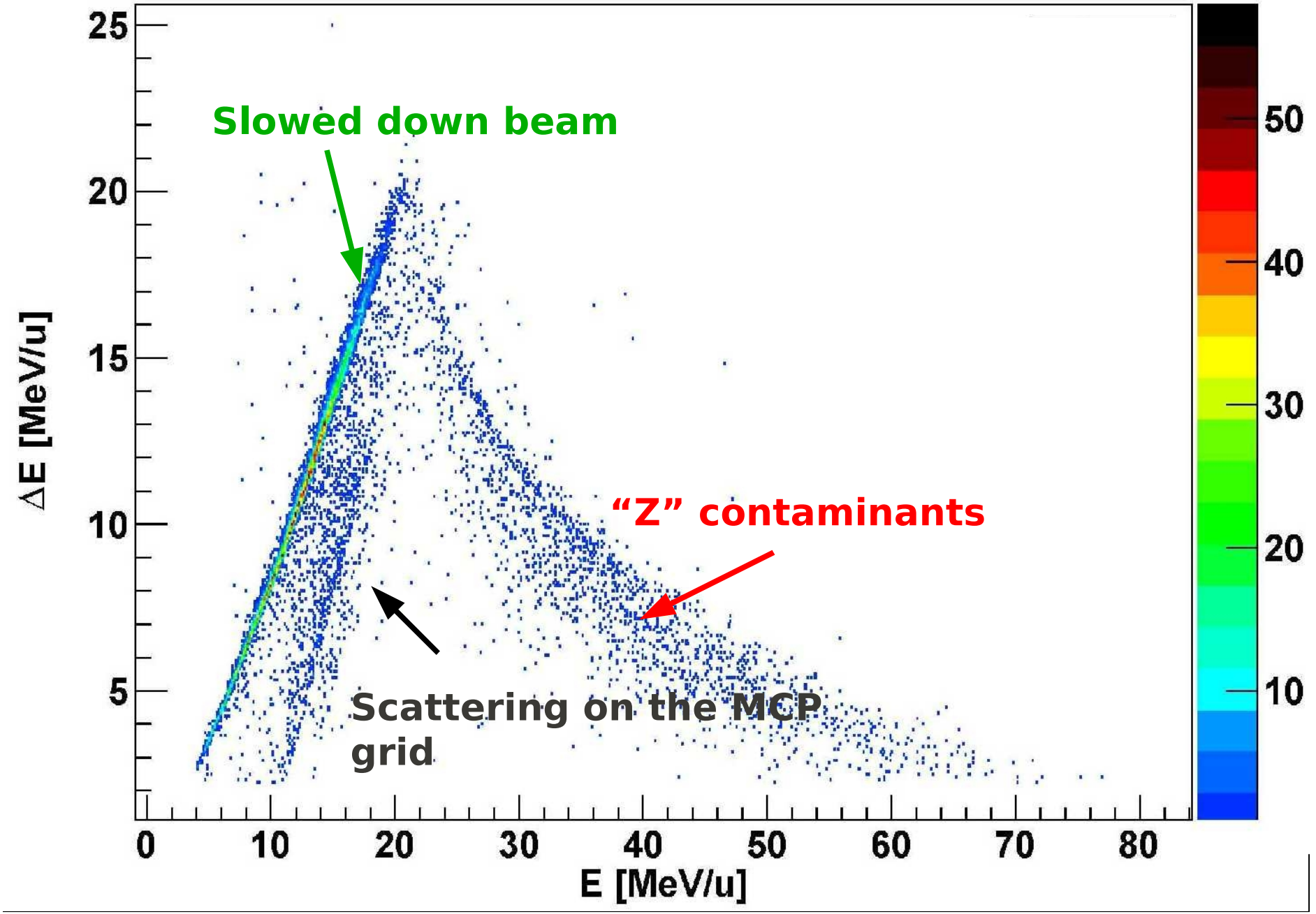
HIC for FAIR
Helmholtz International Center

GSI

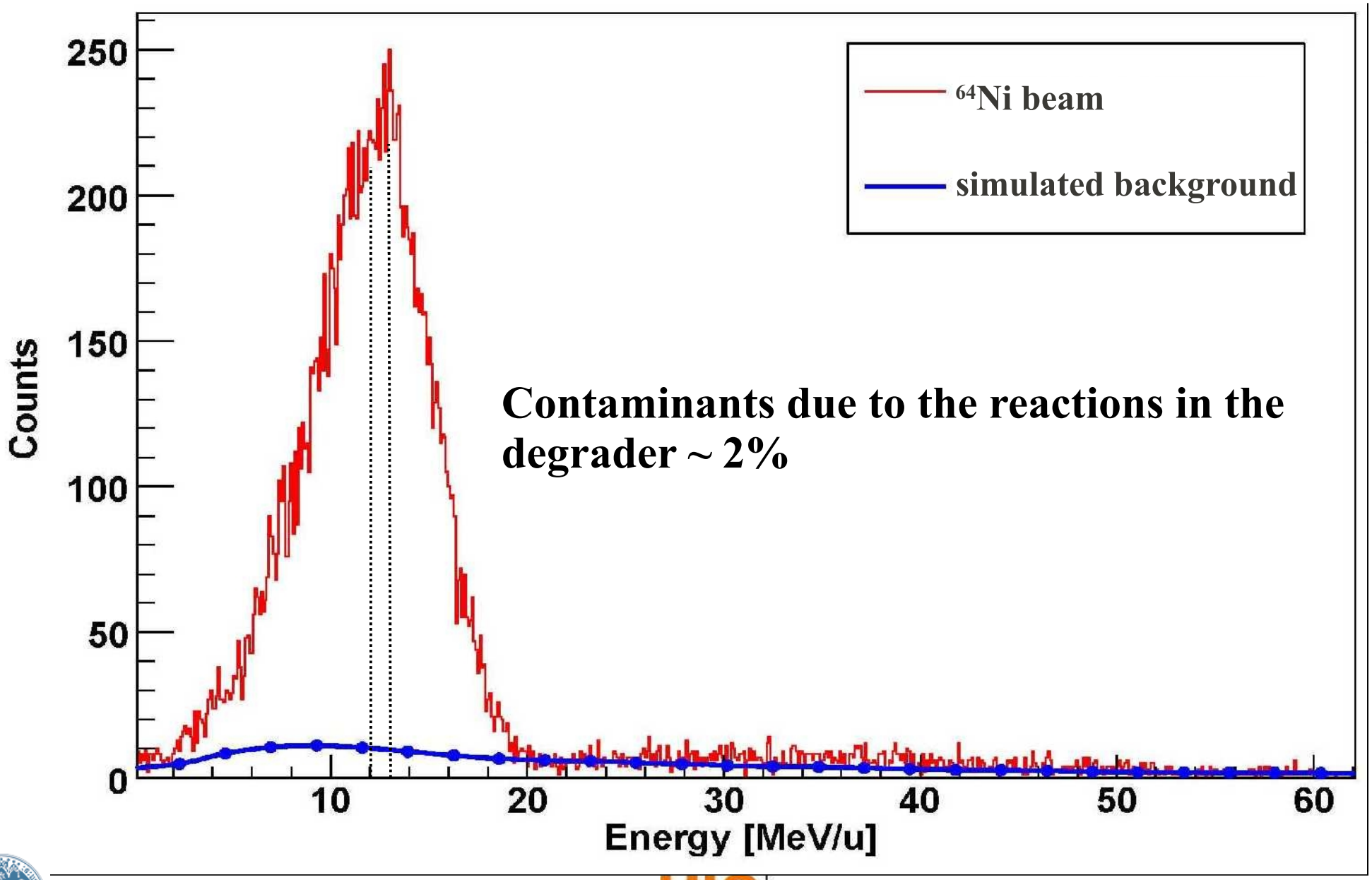
Setup


E (T.O.F)
ΔE
^{64}Ni
@ 250 MeV/u
DEGRADER
PLASTIC
SCINTILLATOR
MCP 1
MCP 2
SILICON
DETECTOR~ 300 um
150 cm
10 cm

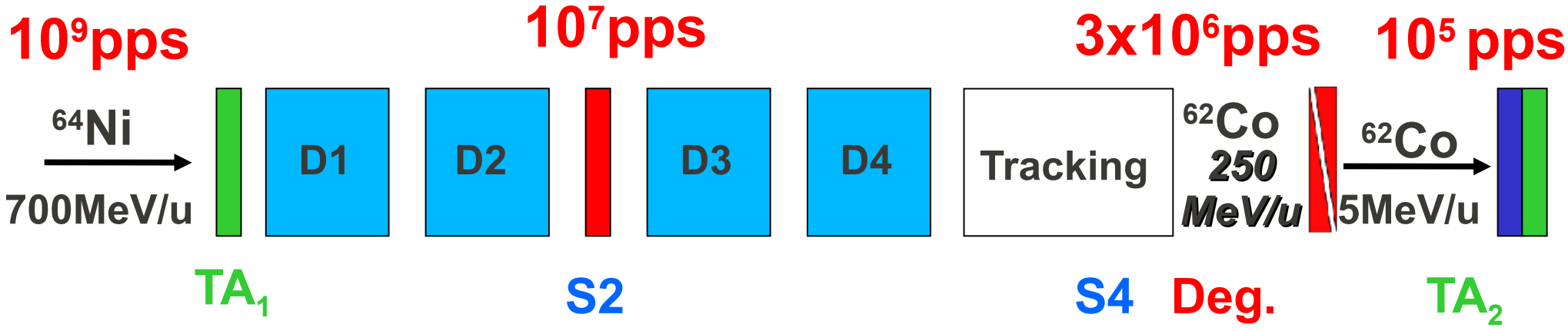
ΔE(Si) versus E(TOF)



Energy after slowing down



Slowed down beams projects and FRS



- 80 % of the beam particles survived slowing down.
- Energy spread after slowing down to
  10 MeV/u is 8 MeV/u.
  The predicted energy spread is 9 MeV/u.
- Contaminants due to the reactions in the degrader
  are of the order of 2%

Collaboration

•GSI group:
P. Boutachkov,
M.Górska, J.Gerl,
H.Geissel, E. Gregor,
I.Kojouharov,
W.Koenig, C.Nociforo,
W.Prokopowicz,
H.Schaffner, H.Weick

LNL group:
J.J.Valiente, A.Gadea

JINR Dubna:
N.Kondratiev

Saclay:
A.Drouart,
A.Polacco

Köln:
J.Jolie,
•F.Naqvi,
G.Pascovici
•M.Pfeiffer

•Sevilla group:
J.Gomez Camacho,
M.Alvarez, J.M.Espino,
I.Mukha, J.M.Quesada

HIC for FAIR
Helmholtz International Center

GSI

ΔE(Si) versus E(TOF)