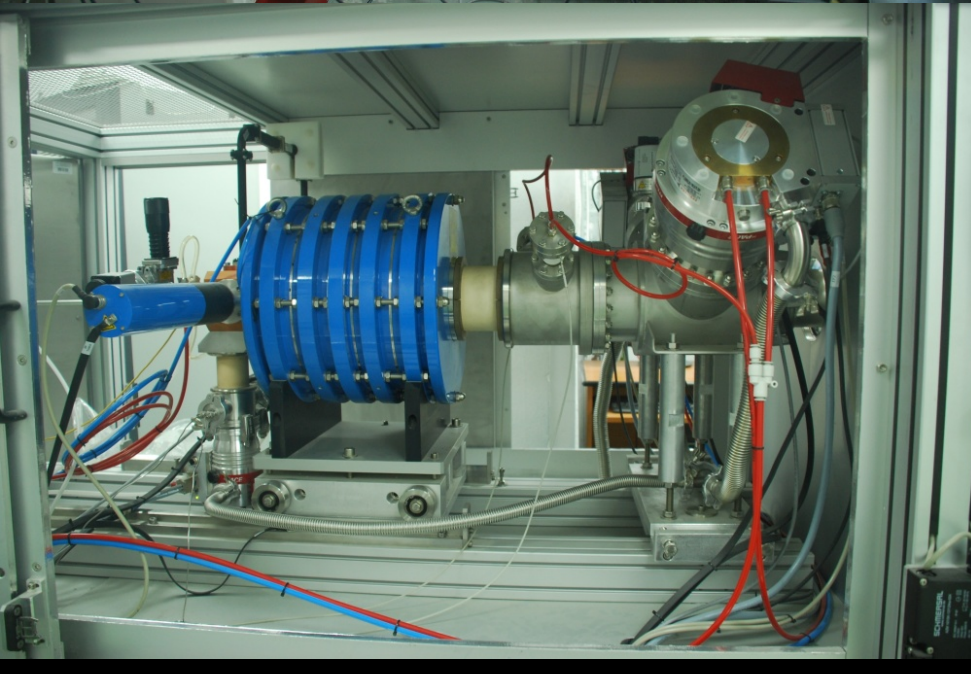


GROUP F: ION OPTICS AND GAMMA RAY DETECTION



1. Ivan Dinev (Sofia University)
2. Jose Manuel Andujar Alaminos (University of Huelva)
3. Melek Derman (Akdeniz University)



Our work is divided into two parts:

- ◎ ION OPTICS:

- Beam transport simulation
- Comparing both softwares used

- ◎ GAMMA RAY DETECTION:

- Measurements
- Analysis

Ion Optics

Supervised by:
O. Steczkiewicz



Software simulation of beam transport from the ion source to the cyclotron, using the :

- ◎ Beamline Simulator v1.4
- ◎ Transport

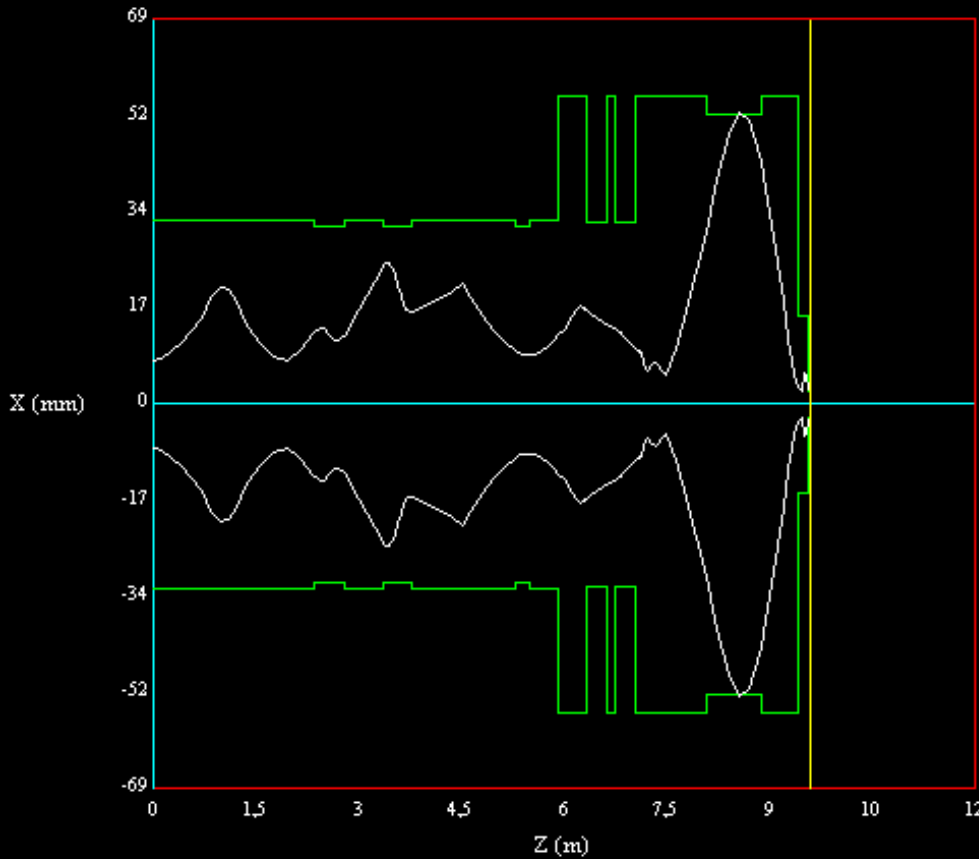
Comparison of the differences of both codes.

Ions simulated: $^{20}\text{Ne}^{+3}$ at 14.7 kV,
and $^{16}\text{O}^{+4}$ at 24 kV

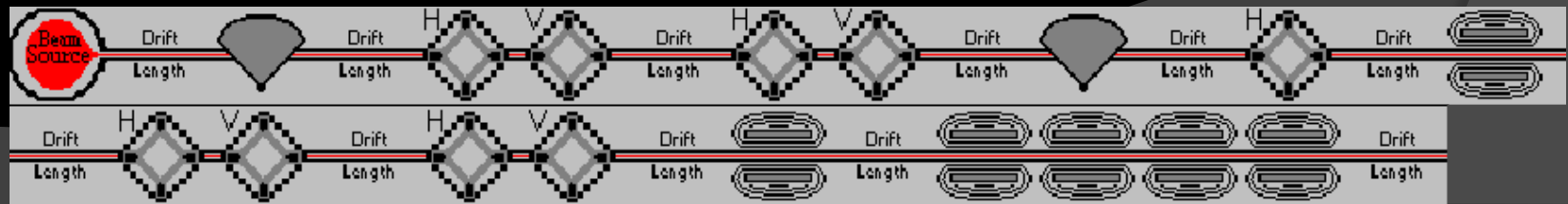
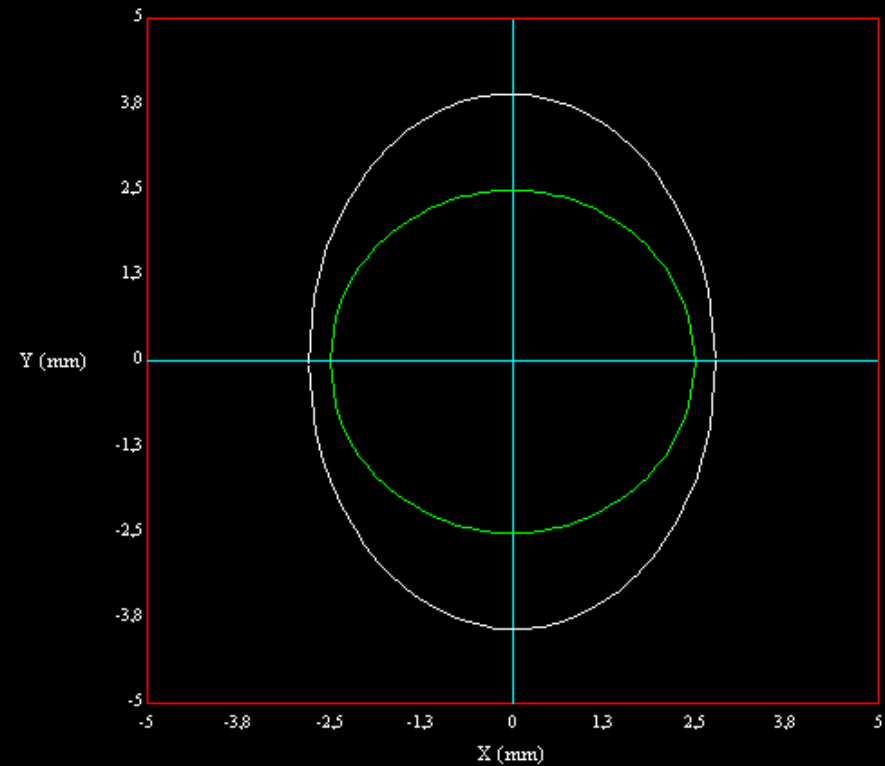
OXYGEN 16

Beamline simulator v1.4

X vs Z



Y vs X



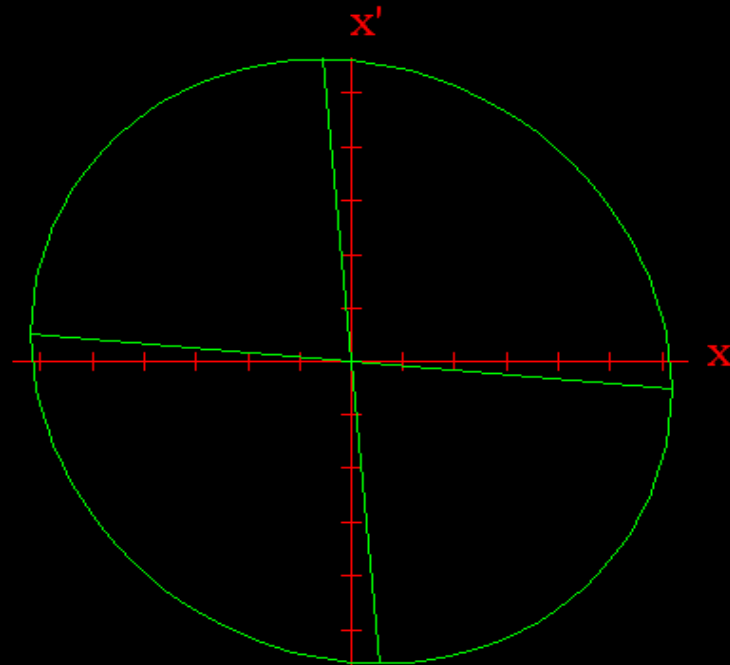
OXYGEN 16

CROSS SECTIONS

$$L_{wx} = 0.00 \text{ m}$$

$$Ch_{ix} = -5.3 \text{ deg } (-0.0919)$$

$$Eps_x = 34.87 * \text{Pi cmmrad}$$



$$X_m = 1.3 \text{ cm}, \quad X'_m = 28.3 \text{ mrad}$$

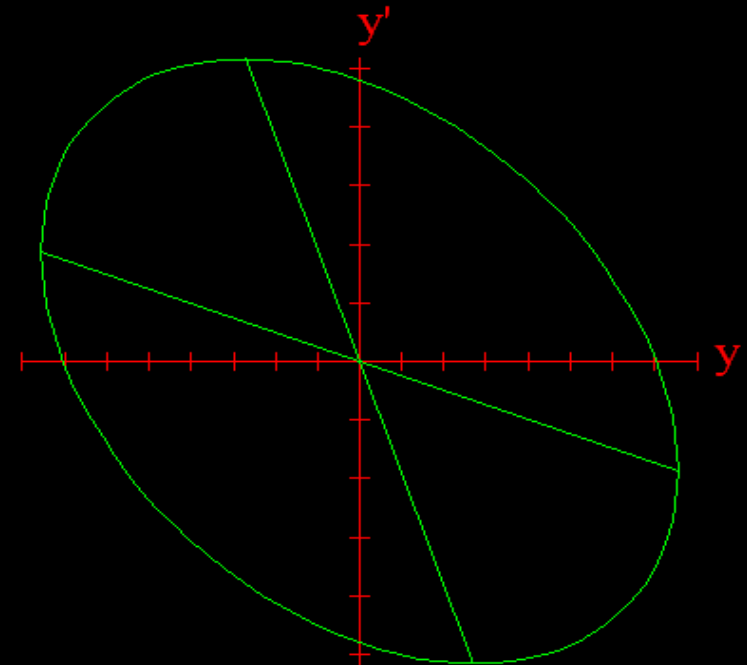
$$D = -0.2 \text{ cm}, \quad D' = 9.4 \text{ mrad}$$

$$*SOLO* \quad z = 9.587 \text{ m} \quad \text{Sol3}$$

$$L_{wy} = 0.01 \text{ m}$$

$$Ch_{iy} = -21.3 \text{ deg } (-0.3628)$$

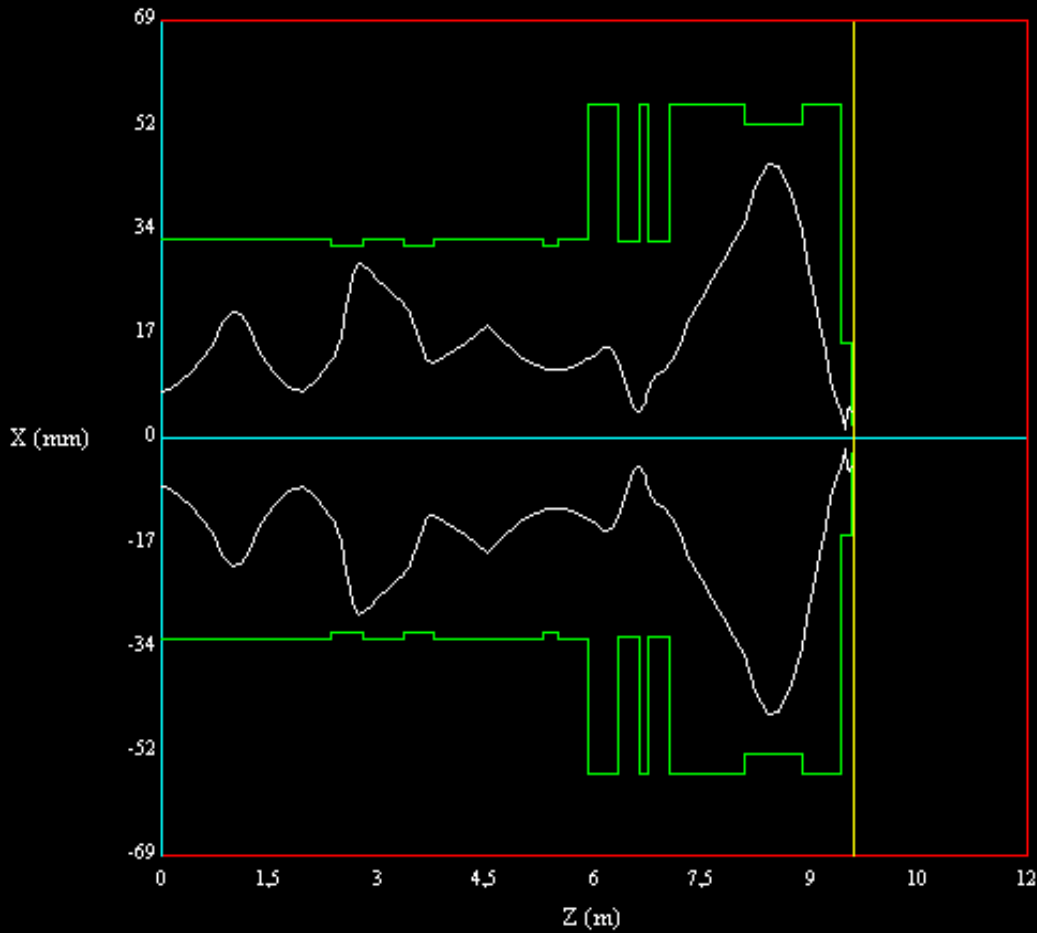
$$Eps_y = 36.41 * \text{Pi cmmrad}$$



$$Y_m = 0.8 \text{ cm}, \quad Y'_m = 51.8 \text{ mrad}$$



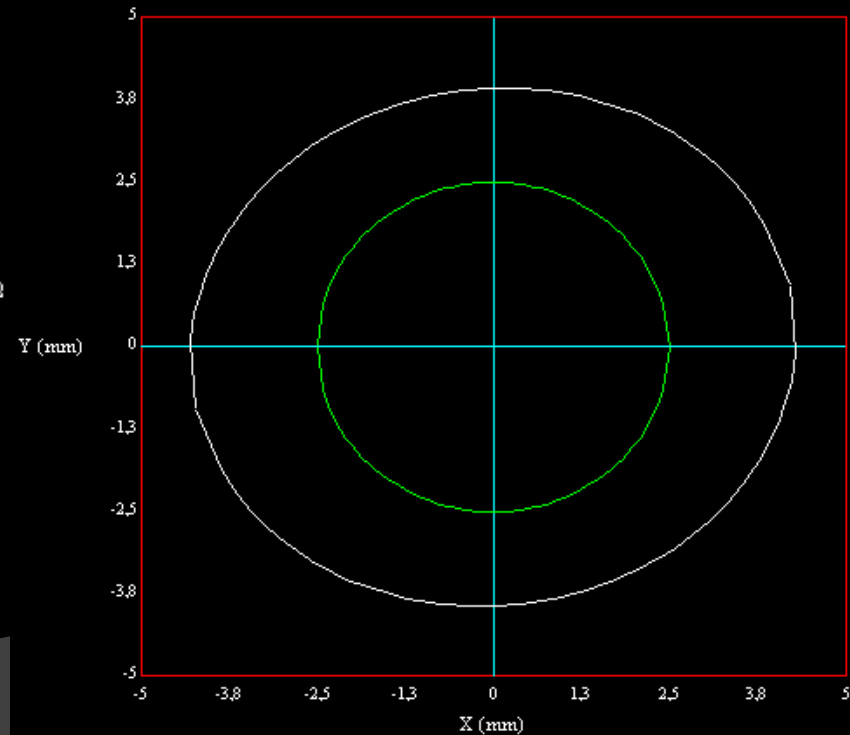
X vs Z



NEON 20

Beamline Simulator v1.4

Y vs X



Gamma – Ray Detection

Supervised by : T. Marchlewski, M. Zielińska

Task:

- Identifying the isotopes produced in the cyclotron due to the ion beams hitting the inside parts of the machine, such as: stripper frames and target holders.
- Measuring the activity of the parts, and comparing results with previous measurements

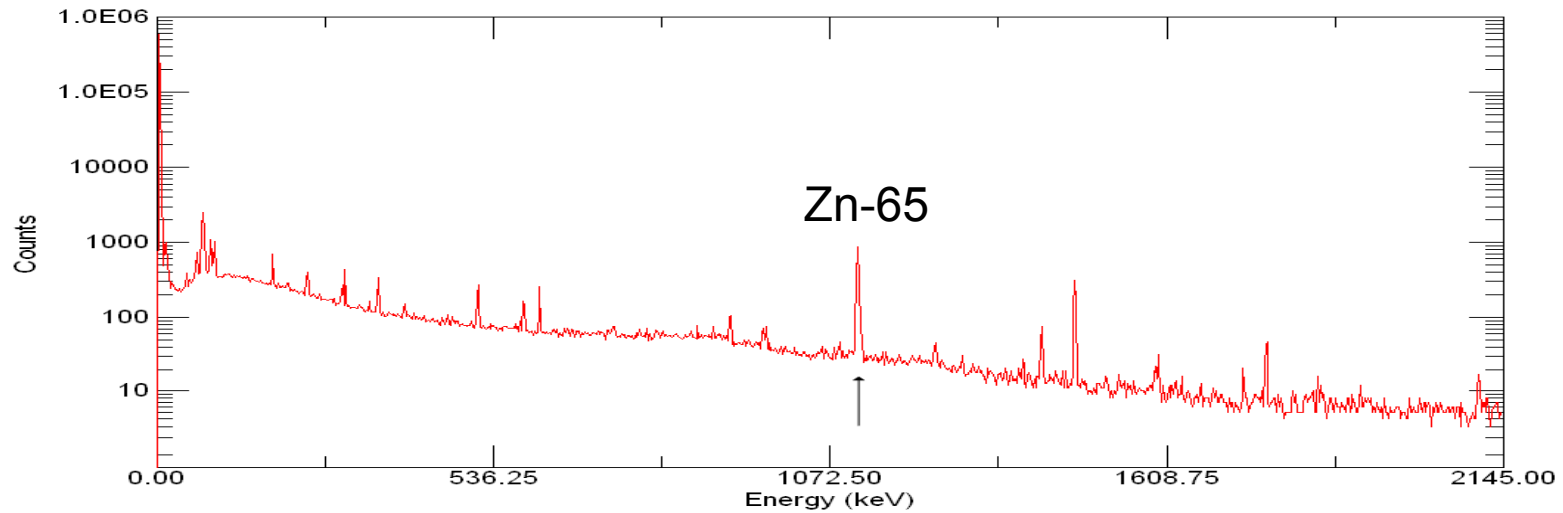


The measured parts:



non_active_frame

new frame 3 cm whole night



Acquired: 2013-Mar-05 14:21:08

File: C:\DOCUME~1\user1\Pulpit\groupf2\non_active_frame.Spc

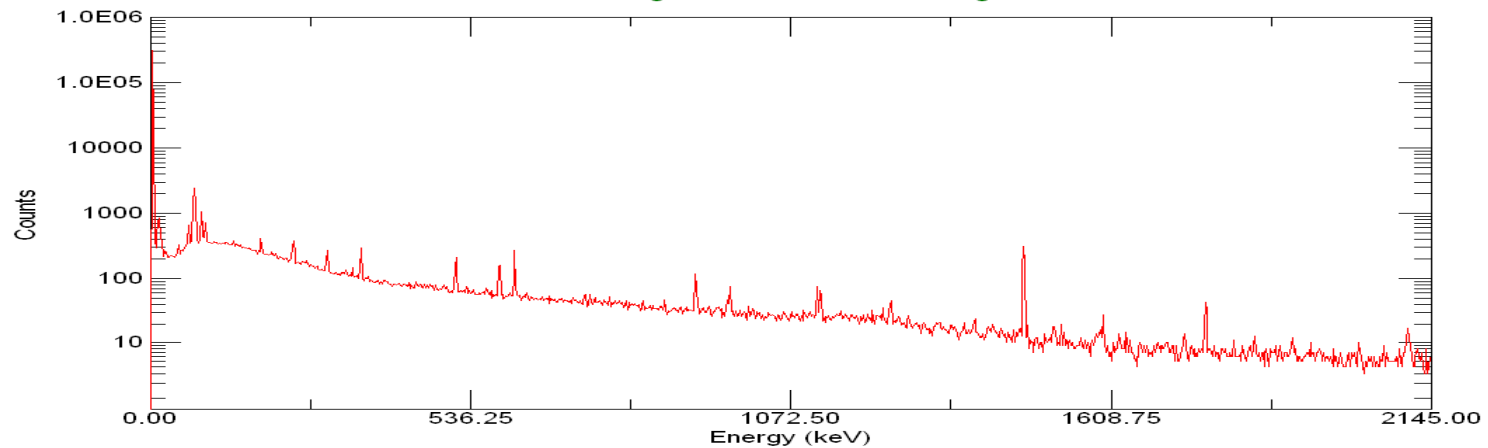
Detector: #65537 DSPEC-091

Real Time: 74280.90 s. Live Time: 74195.70 s.

Channels: 8192

background_led

background inside the led casing



Acquired: 2013-Mar-06 14:07:50

File: C:\DOCUME~1\user1\Pulpit\groupf\background_led.Spc

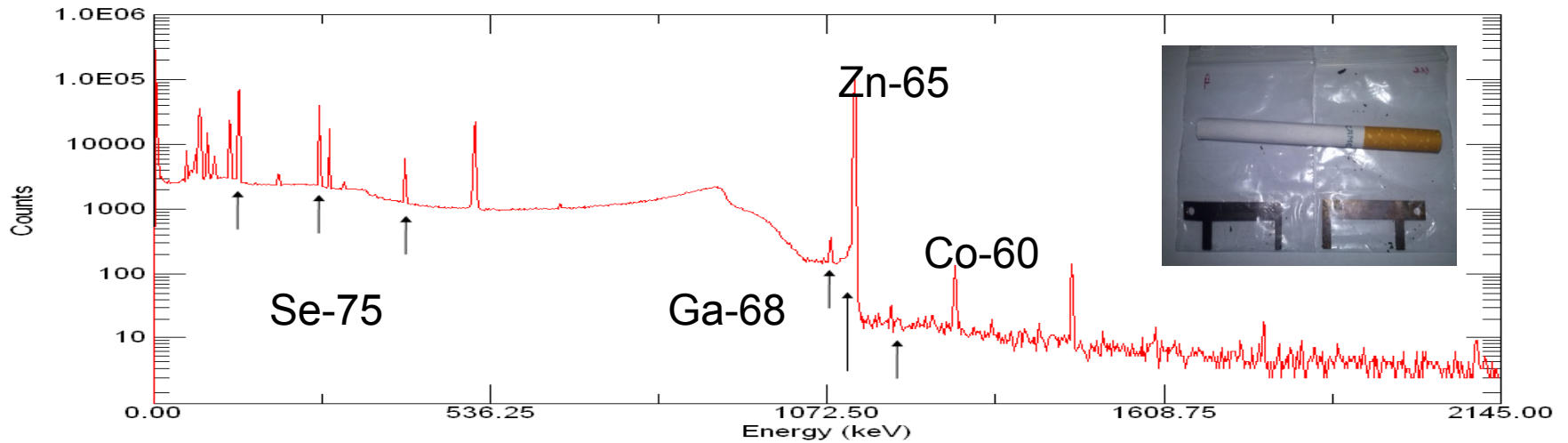
Detector: #65537 DSPEC-091

Real Time: 63298.30 s. Live Time: 63241.28 s.

Channels: 8192

last_year_foil1_long

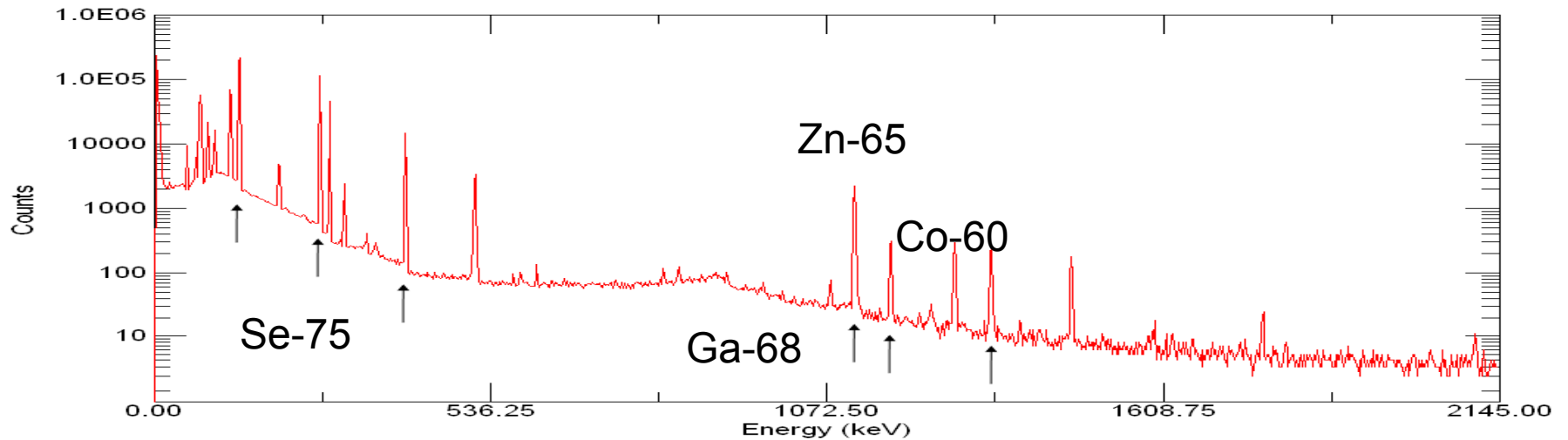
last_years foil_1 8 cm, long measurement



Acquired: 2013-Mar-07 11:41:50 Real Time: 35832.08 s. Live Time: 35622.00 s.
File: C:\DOCUME~1\user1\Pulpit\groupf\last_year_foil1_long.Spc Channels: 8192
Detector: #65537 DSPEC-091

last_year_foil2_long

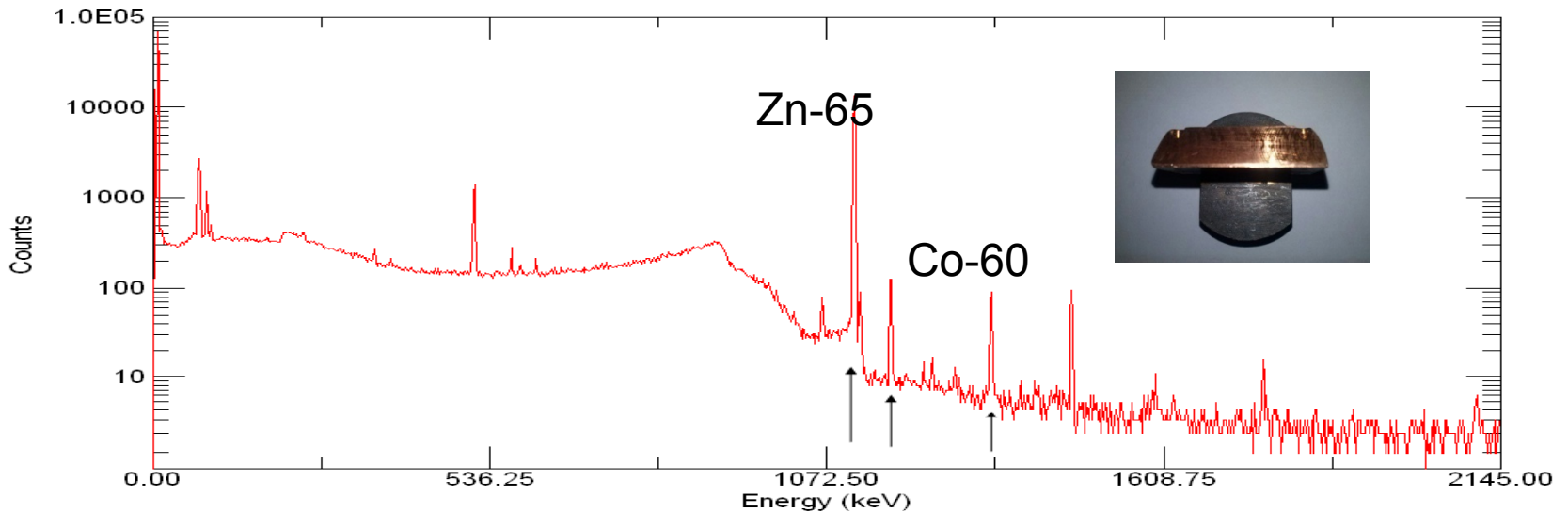
last years frames_2 8 cm, led casing



Acquired: 2013-Mar-07 01:33:26 Real Time: 33643.56 s. Live Time: 33506.48 s.
File: C:\DOCUME~1\user1\Pulpit\groupf\last_year_foil2_long.Spc Channels: 8192
Detector: #65537 DSPEC-091

top_side_measurement

A_part top side, 8 cm



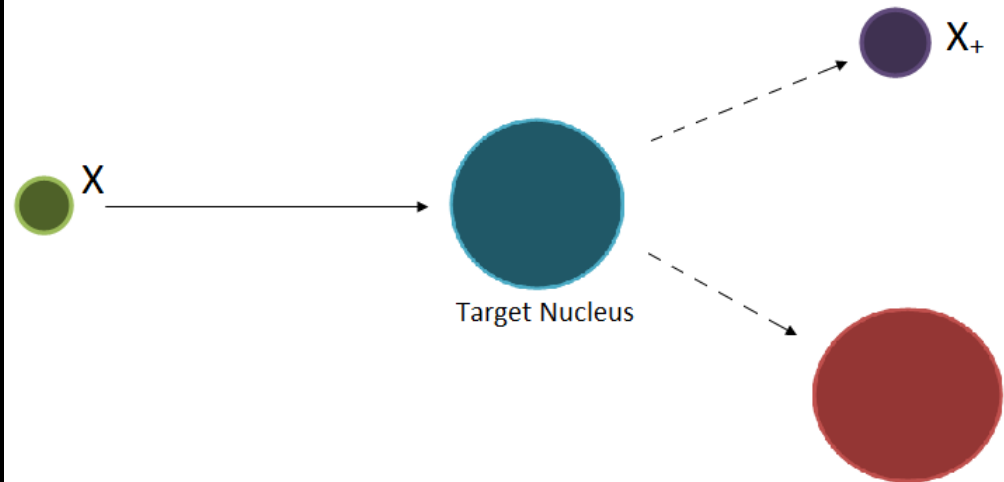
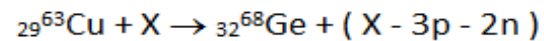
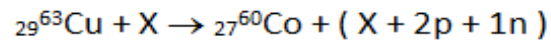
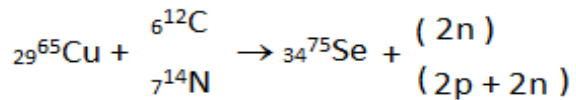
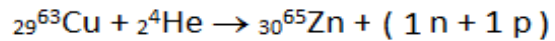
Acquired: 2013-Mar-05 20:29:56

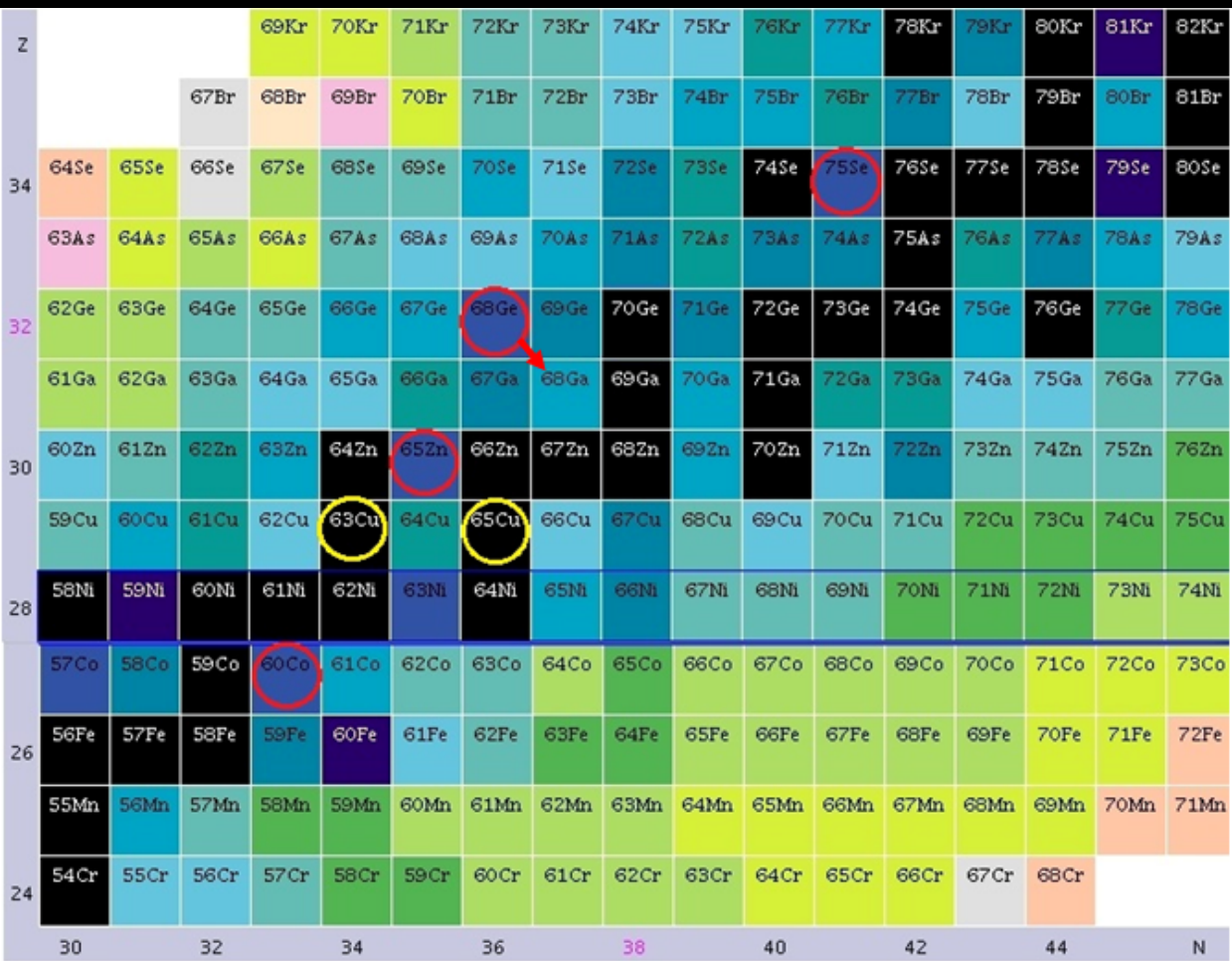
File: C:\DOCUME~1\user1\Pulpit\groupf\top_side_measurement.Spc

Detector: #65537 DSPEC-091

Real Time: 12115.80 s. Live Time: 12084.96 s.

Channels: 8192





activity [Bq]			
stripper frame 1			
Co-60	Zn-65	Ga-68	Se-75
1,1E+00	1,7E+04	1,6E+03	5,0E+02
stripper frame 2			
Co-60	Zn-65	Ga-68	Se-75
2,9E+01	4,1E+02	3,8E+00	1,6E+03
target holder			
	Zn-65	error	~20%
	6,6E+04		
non_active frame			
	Zn-65		
	6,6E+01		



THANK YOU FOR YOUR ATTENTION!! 😊



