LYCCA:
DISAGREEMENT BETWEEN THE EXPERIMENT AND THE LISE++ CALCULATIONS

The experimental data that is being analysed is ***S433*** a.k.a. ***Coulomb Excitation of ^{52}Fe*** that was done during the AGATA-PRESPEC campaign in October, 2012 at GSI. The LISE++ file has been provided by P. Boutachkov (GSI), and fully represents the setup used in the experiment. This informal small report will be discussing the disagreement between the experimental data and the simulations done using LISE++.

The disagreement concerns the production ratio (i.e. the cross section) of the fragments detected in LYCCA and the one simulated with LISE++. In order to make the simulations as realistic as possible, the reactions inside the Secondary Target, SC41, LYCCA ToF Start, LYCCA ToF Target and LYCCA ToF Stop scintillator detectors have been taken into account. The calculated ratios of the fragments are shown in Table 1.

Table 1. Ratios of different Z in the simulations.

Z	stats	percent
26	8.86E+005	96.64%
25	9534.896893	1.04%
24	6156.7232678	0.67%
23	4309.08032	0.47%
22	3818.8771582	0.42%
21	3598.81191	0.39%
20	3332.5452682	0.36%
TOTAL	***9.16E+005***	

A similar table could be created using the experimental data, introducing bananas of different Z values on the E vs dE plot of LYCCA and comparing the statistics. The measured ratios are shown in Table 2.

Table 2. Ratios of different Z in the experiment

Z	stats	percent
26	200123	26.06%
25	67850	8.84%
24	102964	13.41%
23	100136	13.04%
22	123630	16.10%
21	87284	11.37%
20	85920	11.19%
TOTAL	***767907***	100.00%

Although the expectations in the simulations show more than 90% of the production fragments are Fe ions, their production in the experiment is less of a factor of ~4.

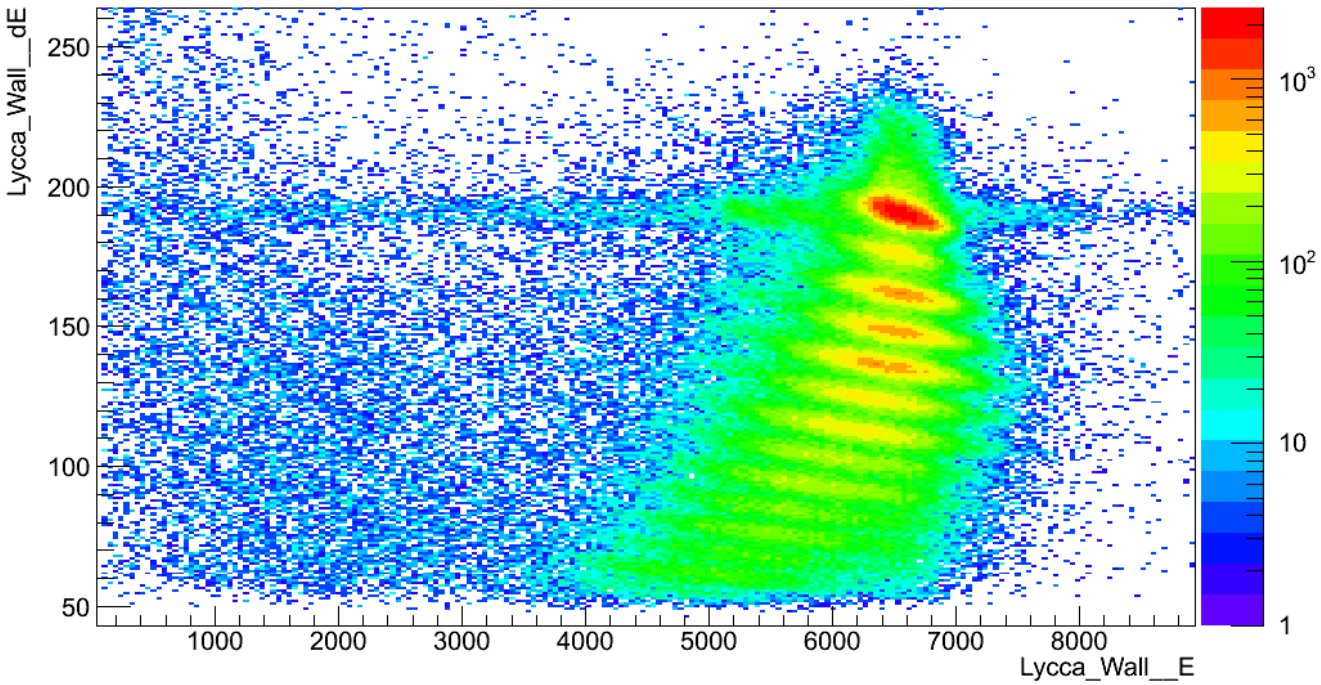

Figure 1. E vs dE plot in the experiment to visualize the unexpected production of Z < 26 fragments.

The efficiencies of FRS and LYCCA are measured as 50% and 70% in the experiment, respectively. Even though the efficiencies of the setup are as expected, the counts are distributed around Z < 26 (Fig. 1).

OPEN QUESTION

The reason behind the low production probability of Fe is not understood and the big difference between the calculations and the experiment should be explained.