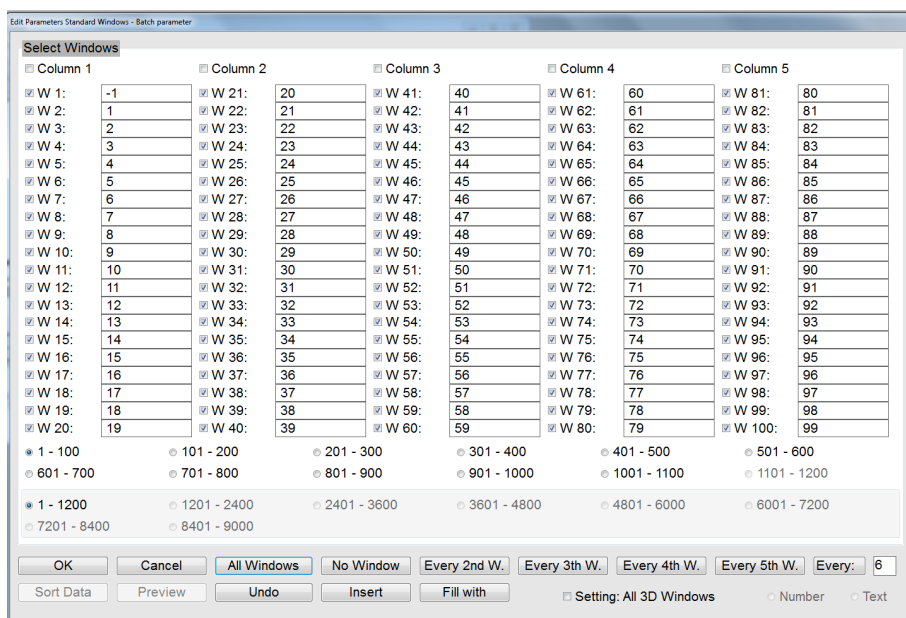


## What is new in UNIFIT 2015?

Main focus of the advancement of the **UNIFIT 2015 software** was the implementation of new processing and presentation features for the treatment of a very large number of spectra of line scans and multipoint (area) scans. This requires the more efficient usage of the main memory by the software UNIFIT and an optimised presentation routine of the spectrum windows. As the result of the software optimisation the number of simultaneously processable spectra was increased from 1200 to 9000. The three new functions 'XY 3D Plot 45°', 'XY 3D Plot -45°' and 'XY 3D Colour Profile' allow the presentation of the element distribution or the plot of the distribution of the chemical components with respect to the x and y values of the recording position on the sample.

- i) Realization of a more efficient using of the main memory of the used computer system by UNIFIT. The loading time of projects with a large number of spectra is ten times lower.
- ii) The maximum number of simultaneously processable spectra windows was increased to 9000.
- iii) The standard-window selection dialogue was adjusted to the large number of processable spectra (see Fig. 1). The number of the selection functions has been improved.



**Fig. 1.** The new designed selection dialogue for standard windows

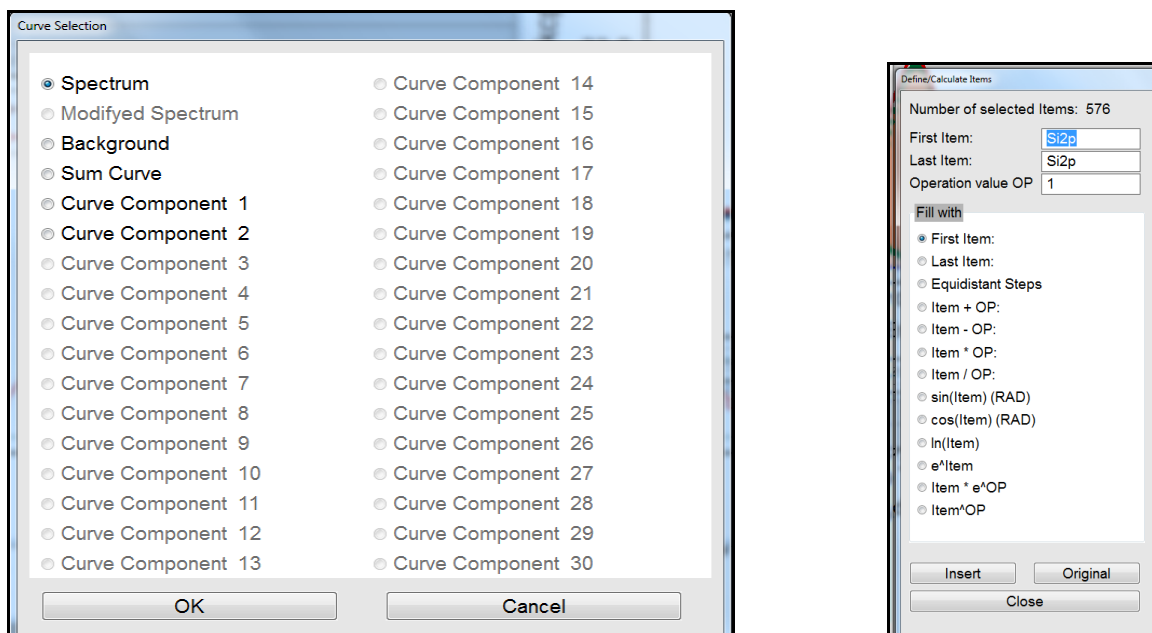
- iv) The selection of presentable curves including the 3D plots has been expanded (see Fig. 2, left). Five different curves are offered:

1. Spectrum,

2. Modified spectrum,
  3. Background function,
  4. Sum curve after a peak fit,
  5. Component curve  $i$  after a peak fit ( $i = 1$  to  $n$ ,  $n$  - number of components during the peak fit).
- v) The menu for the editing of spectrum parameters has been completely refreshed. A special additional sub-menu ('Fill With' button) allows the easy manipulation of the values (see Fig. 2, right). The choice of editable parameters was expanded to
1. Spectrum name,
  2. Batch parameter,
  3. x position,
  4. y position,
  5. Comment,
  6. Lens mode,
  7. Analyser Mode,
  8. Pass energy.

The communication with external programmes via the copy-paste function was improved.

- vi) The acquisition parameters  $x$  and  $y$  of line scans or multipoint scans can be used as abscissa of the parameter plot.

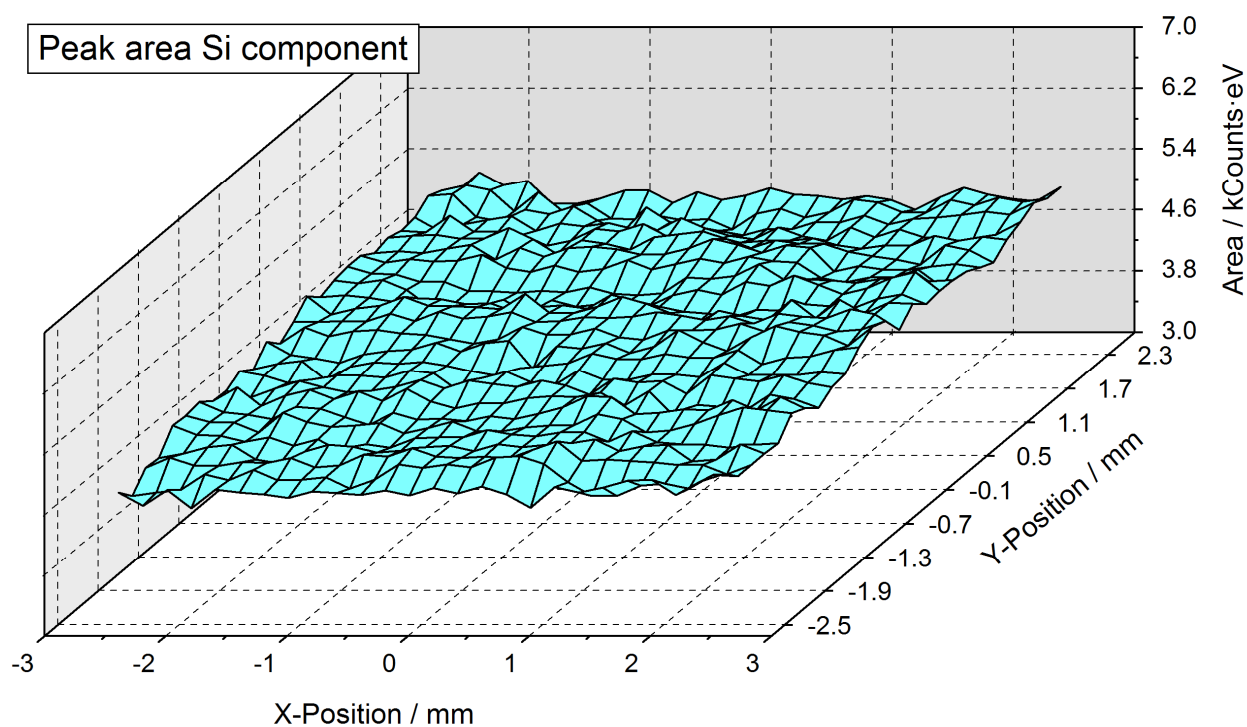


**Fig. 2.** Left: curve selection dialogue of standard windows for the 3D plots, two components were fitted, right: manipulation and calculation sub-menu of editable spectrum parameters

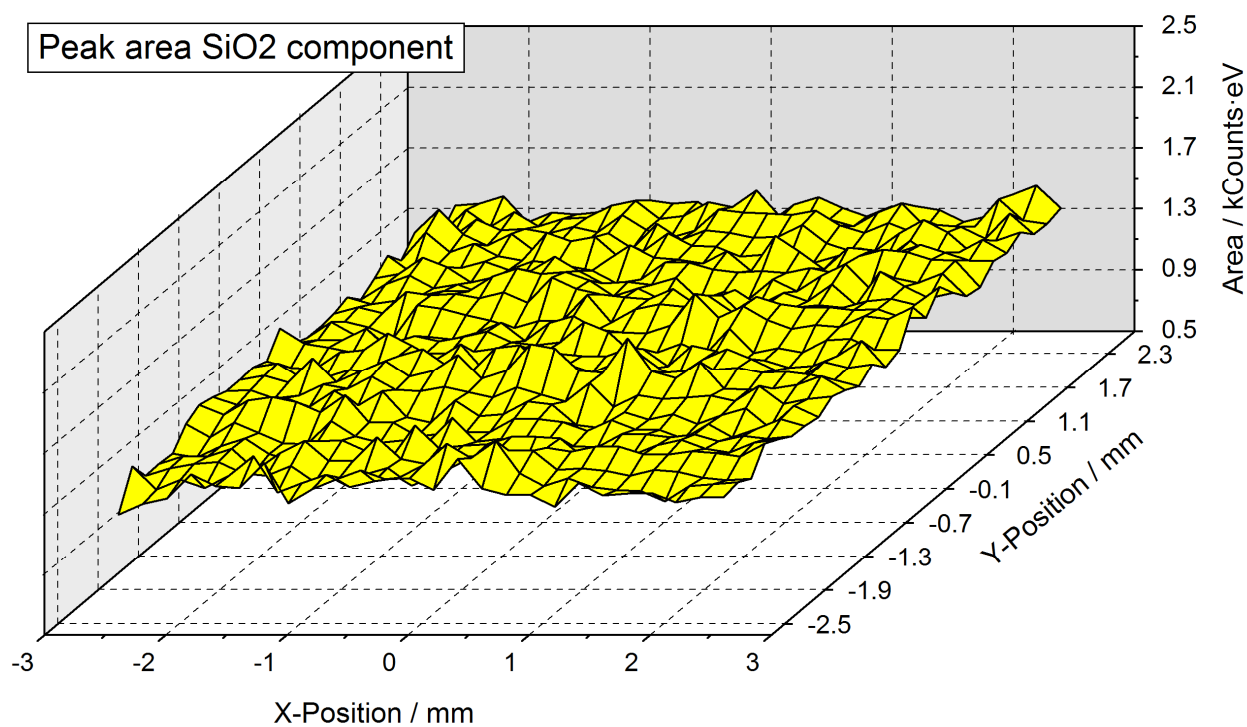
- vii) The quantification table was adjusted to the large number of spectra.

- viii)** The layout of the controls has the common Windows design. The so-called manifest of the Unifit2015.exe was accordingly modified. Additional design features were implemented.
- ix)** The useable and currently used main memory of the Unifit software can be displayed via an additional information function.
- ix)** The direct activation of the spectrum windows was changed and adjusted to the large spectra number.
- x)** The menu points 'Close Windows', 'Close Standard Windows', 'Charge Correction' and 'Original/Accept Preferences' apply for all windows or for a number of selected windows only.
- xi)** The three new functions 'XY 3D Plot 45°', 'XY 3D Plot -45°' and 'XY 3D Colour Profile' allow the presentation of the distribution of the elements or chemical components with respect to the x-y position for the measurement of the sample. Five different display options are offered:
  1. Maximum of the intensity of the spectrum,
  2. Minimum of the intensity of the spectrum,
  3. Background-free area,
  4. Area of the sum curve after a peak fit,
  5. Area of the chemical component  $i$  ( $i = 1$  to  $n$ ,  $n$  - number of components during the peak fit).

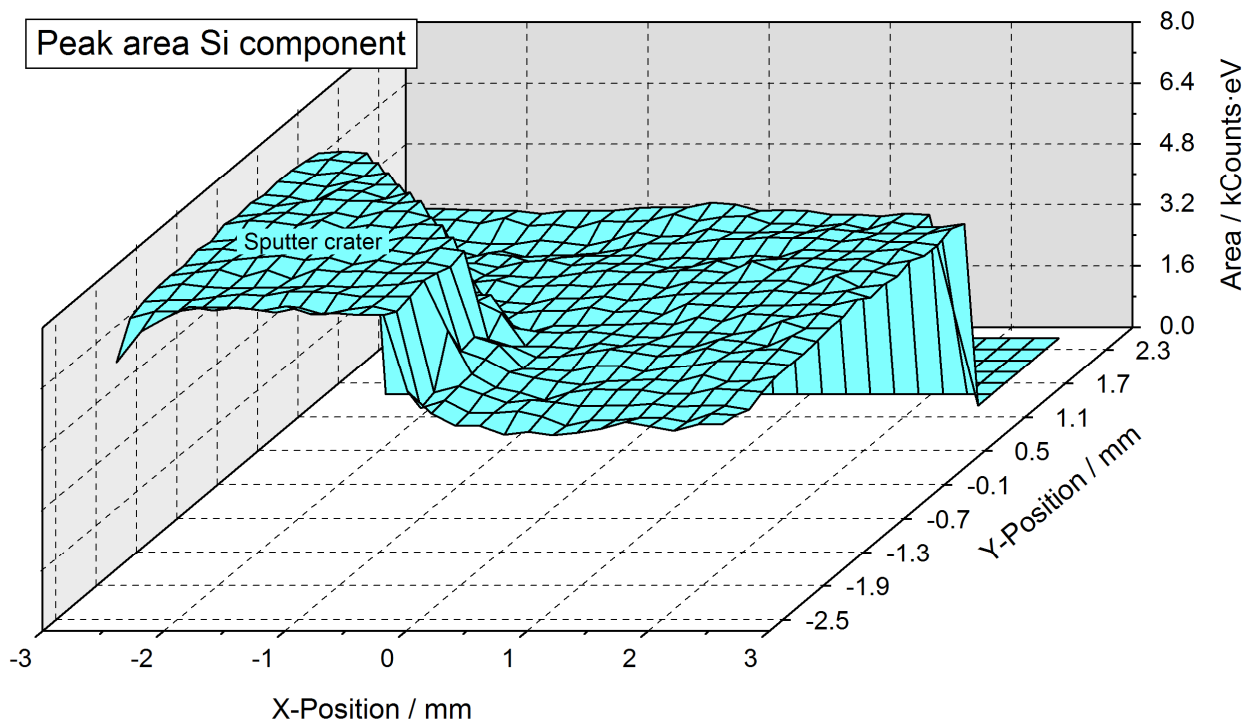
The Fig. 3 and 4 show a 'XY 3D Plot 45°' of Si and SiO<sub>2</sub> of a multipoint scan (26x26 points) of a untreated Si sample, respectively. The Figs. 5 - 7 show the same sample after sputtering. The sputter crater can be found on the left side (Fig. 5). The position  $x = 0$  and  $y = 0$  is the normal recording position. The zero intensities represent the measurements without x-ray excitation (x-ray source was switched off). The Fig. 5c and 6c show the corresponding 'XY 3D Colour Profiles' of Fig. 5b and 6b, respectively.
- xii)** The appearance of the colour-scale bar of the '3D Colour Profiles' is optionally and the position variable.
- xiii)** Now the software can use more than 3 GByte main memory. The 'Large Address Flag' of the UNIFIT.exe was settled.



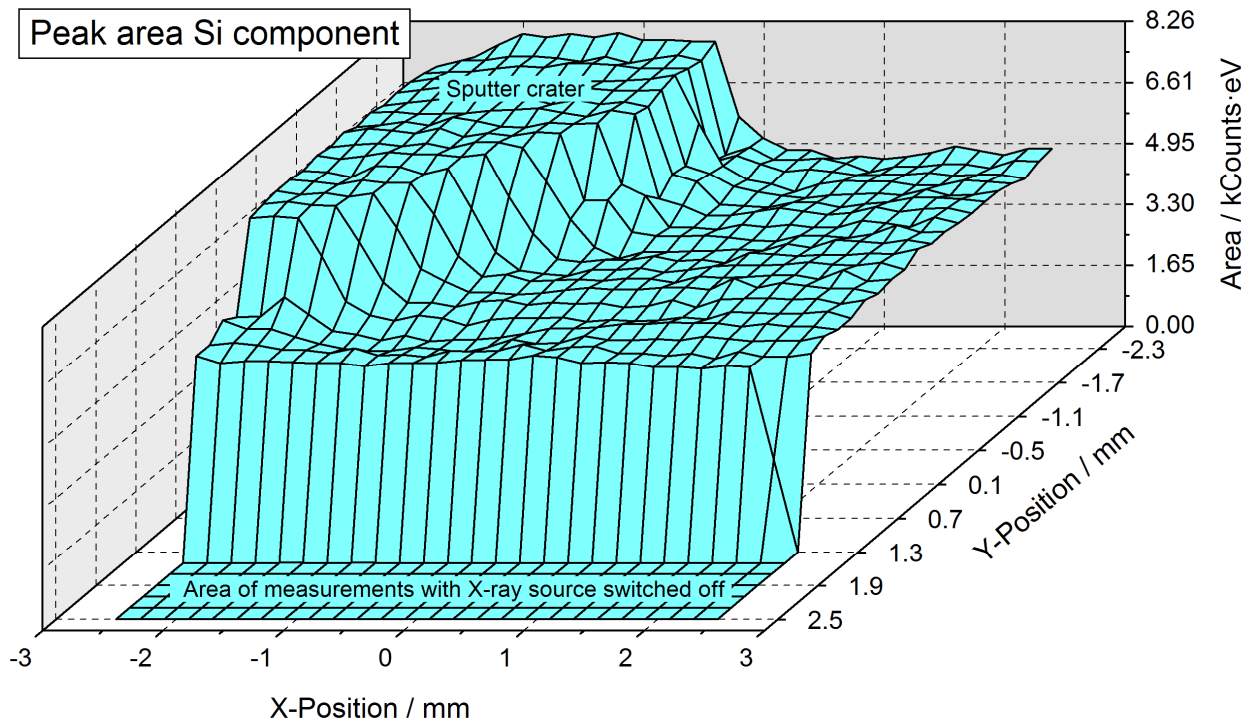
**Fig. 3.** 'XY 3D Plot 45°' of the area of the Si component after the peak fit of a untreated Si sample, plot created using UNIFIT 2015 and inserted in this document



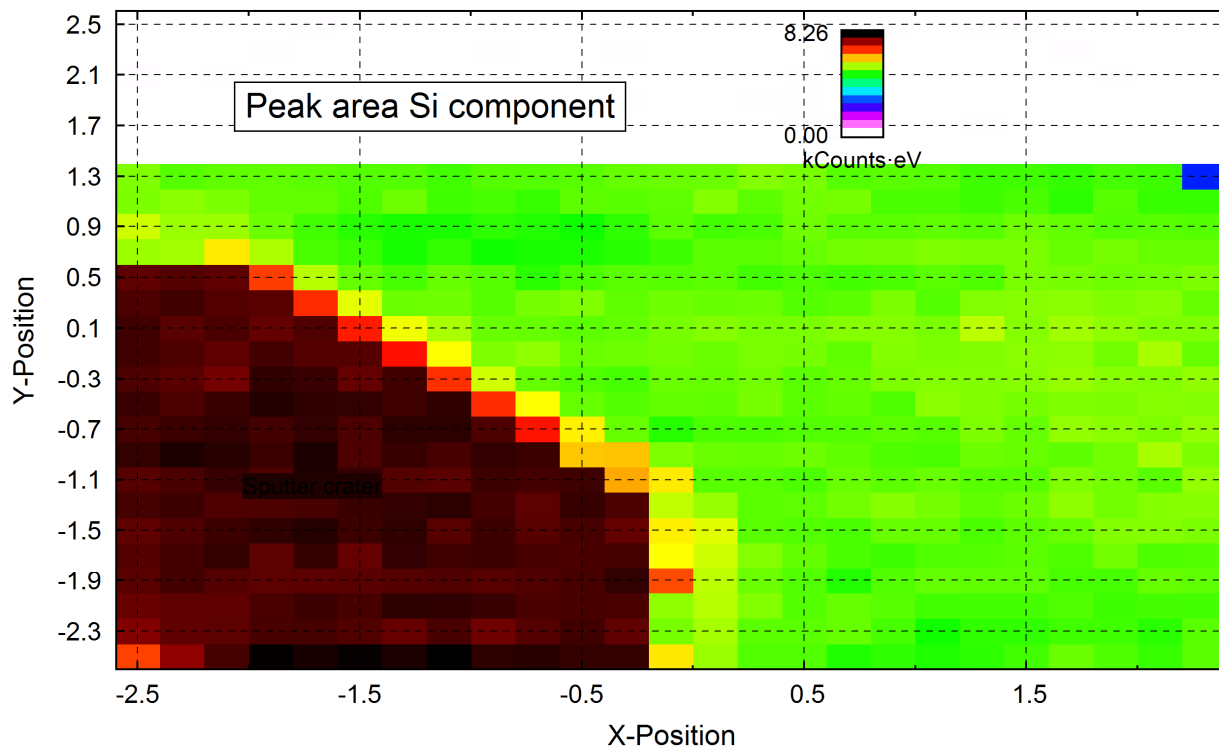
**Fig. 4.** 'XY 3D Plot 3D 45°' of the area of the SiO<sub>2</sub> component after the peak fit of a untreated Si sample, plot created using UNIFIT 2015 and inserted in this document



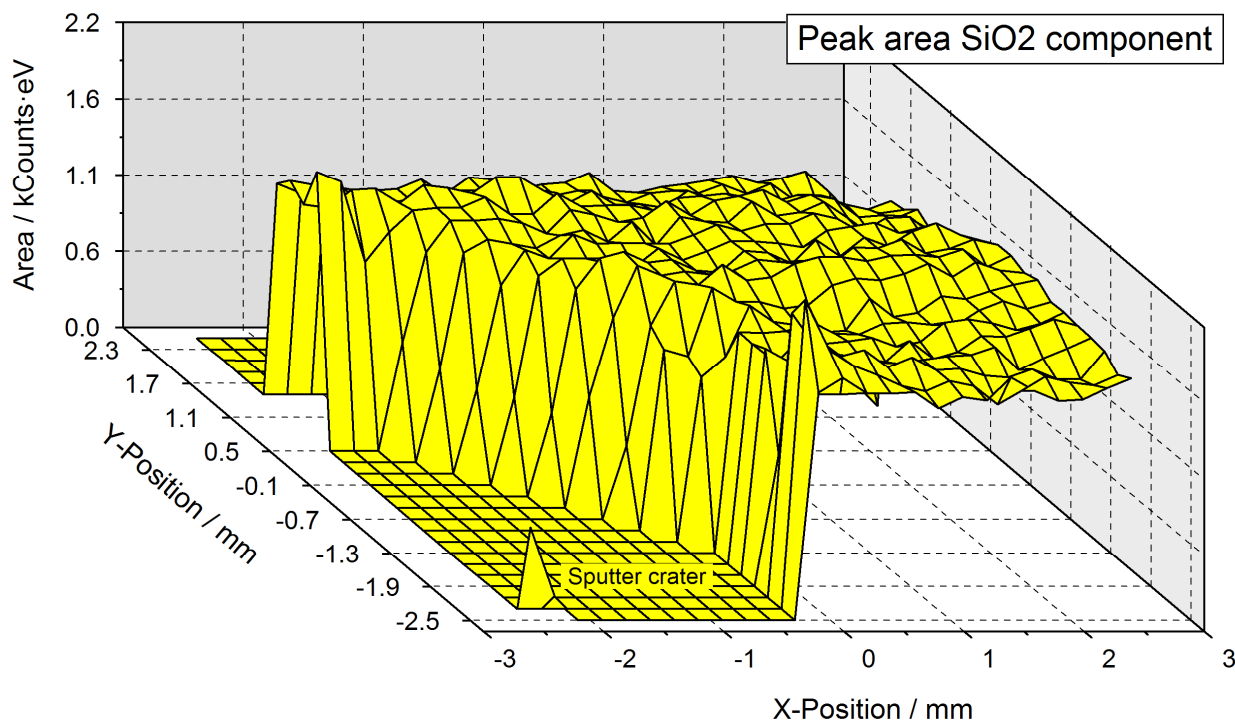
**Fig. 5a.** 'XY 3D Plot 45°' of the area of the Si component after the peak fit of a sputtered Si sample, areas with zero intensities show the measurement with the condition: X-ray source switched off, plot created using UNIFIT 2015 and inserted in this document



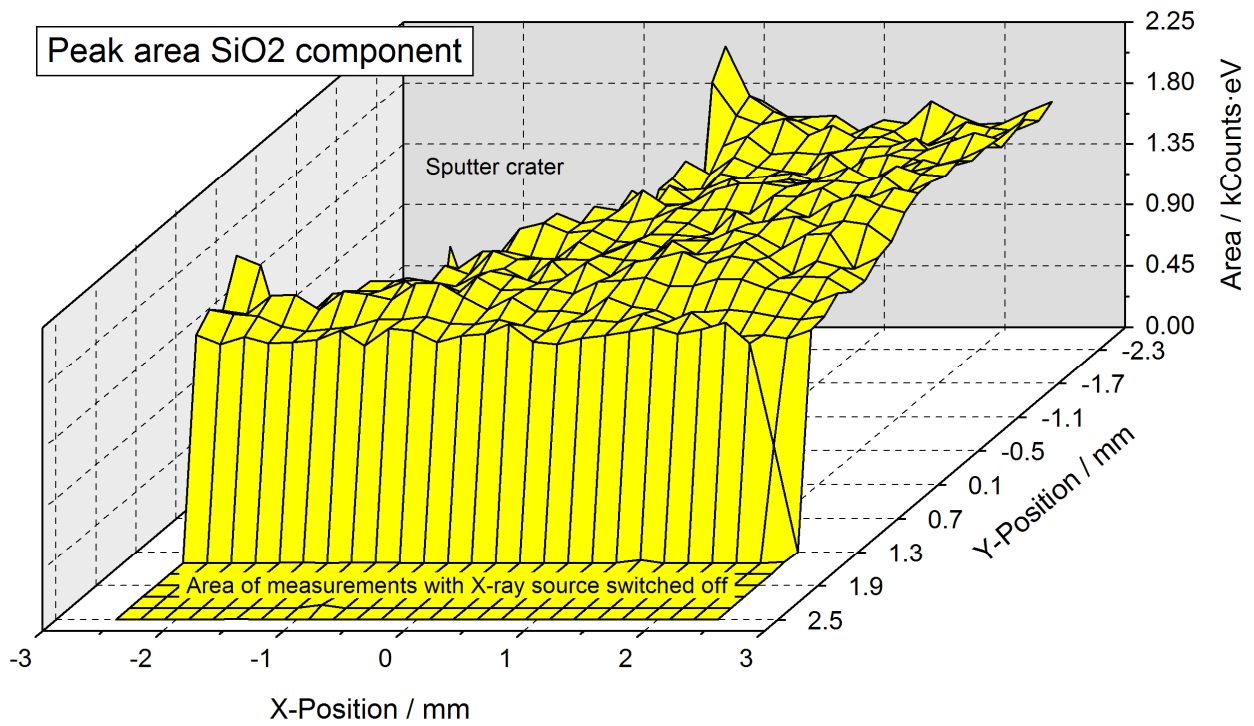
**Fig. 5b.** 'XY 3D Plot 45°' of the area of the SiO component after the peak fit of a sputtered Si sample, reversed presentation, areas with zero intensities show the measurement with the condition: X-ray source switched off, plot created using UNIFIT 2015 and inserted in this document



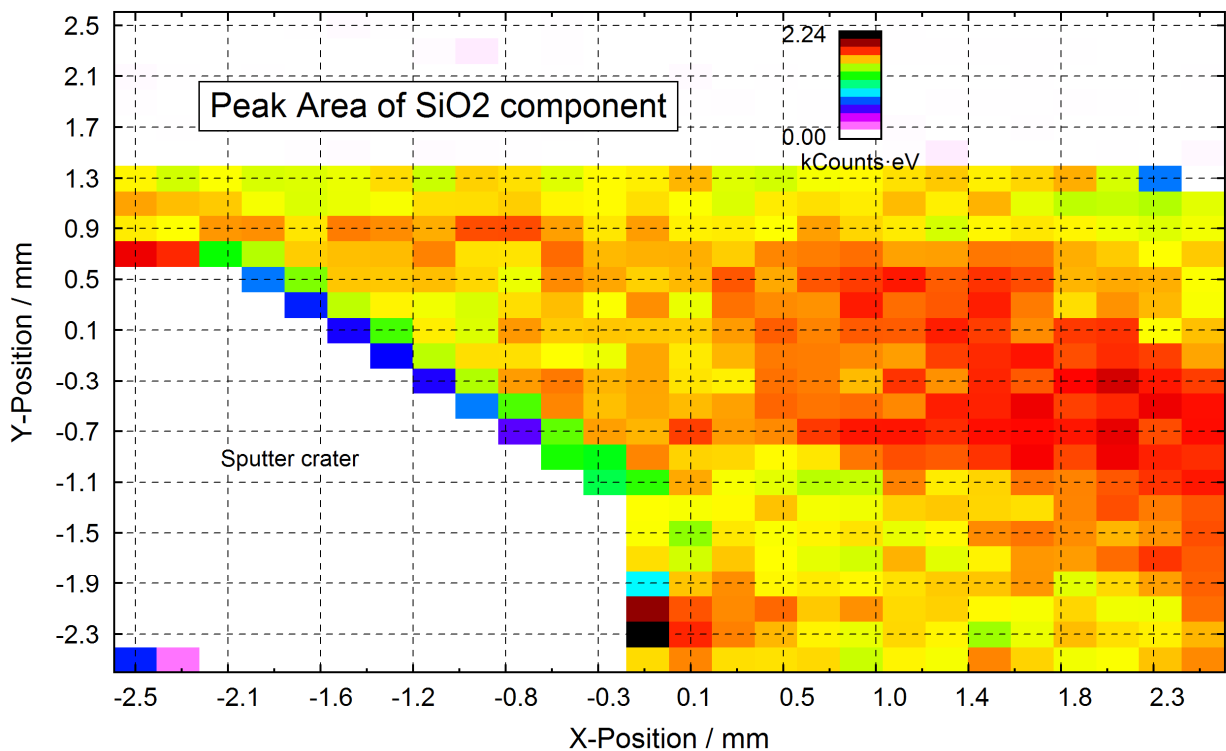
**Fig. 5c.** 'XY 3D Colour Profile' of the area of the SiO component after the peak fit of a sputtered Si sample, corresponding presentation of fig. 5b, areas with zero intensities (white colour) show the measurement with the condition: X-ray source switched off, plot created using UNIFIT 2015 and inserted in this document



**Fig. 6a.** 'XY 3D Plot -45°' of the area of the SiO<sub>2</sub> component after the peak fit of a sputtered Si sample, areas with zero intensities show the measurement with the condition X-ray source switched off or removed SiO<sub>2</sub> coverage, plot created using UNIFIT 2015 and inserted in this document



**Fig. 6b.** 'XY 3D Plot 45°' of the area of the SiO<sub>2</sub> component after the peak fit of a sputtered Si sample, areas with zero intensities show the measurement with the condition X-ray source switched off or removed SiO<sub>2</sub> coverage, plot created using UNIFIT 2015 and inserted in this document



**Fig. 5.** 'XY 3D Colour Profile' of the area of the SiO<sub>2</sub> component after the peak fit of a sputtered Si sample, corresponding presentation of fig. 6b, areas with zero intensities (white colour) show the measurement with the condition X-ray source switched off or removed SiO<sub>2</sub> coverage, plot created using UNIFIT 2015 and inserted in this document