Probe Software

Software for MicroAnalysis

Probe for EPMA

Probe Image

PictureSnapApp

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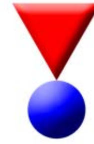
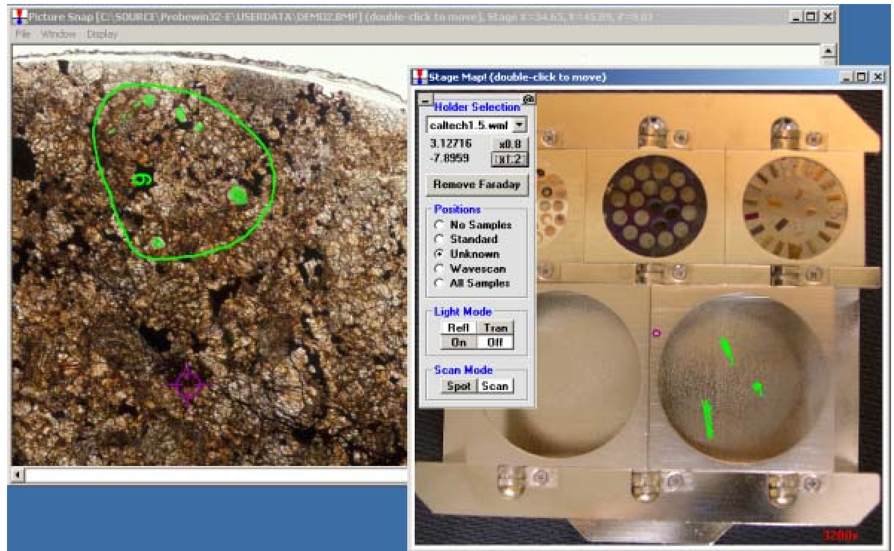


Probe for EPMA: Software for Electron Probe MicroAnalysis

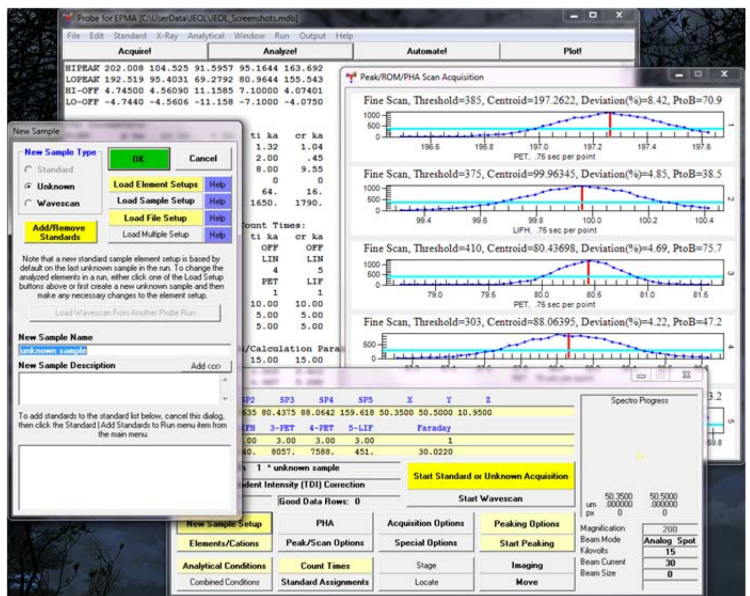
- Navigate your sample graphically using the StageMap and PictureSnap click and go features!

  - User definable stage maps using drawings or scans.
  - Easy importing for optical sample scans.
  - Two or three point stage calibrations.
  - Automatically corrects for sample rotation and tilt.
  - Live current position cursor.
  - Live scan size display based actual magnification.
  - Display digitized standard and unknown coordinates.
  - Display previously acquired data points.
  - Save, export or print annotated images.



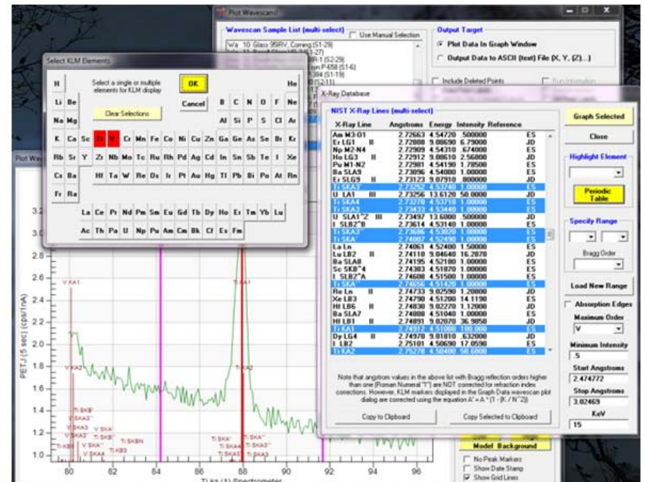
- Create and acquire integrated unknowns, standards and wavescans with two mouse clicks!

  - One application acquires, analyzes and outputs all sample types.
  - Load previously configured sample setups and easily modify.
  - Import prior standardizations and easily update if necessary.
  - One button update of peak positions and PHA settings.
  - All peaking scans and PHA scans automatically saved.
  - User definable dwell time and scan density for peak centering.
  - Browsable element setup database with search capability.
  - Choice of parabolic, maxima and gaussian peak fitting.
  - Automatic acquisition of all element ROI scans for off-peaks.



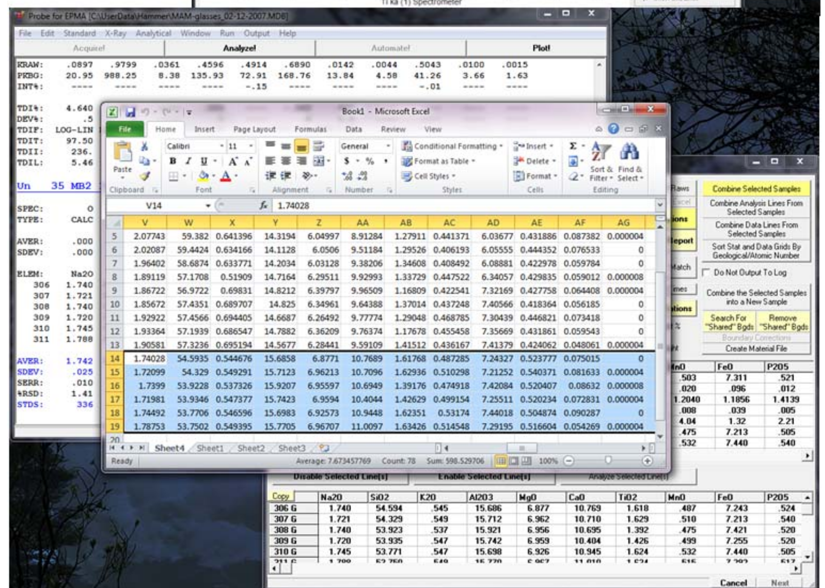
- Check for interferences automatically and adjust off-peak positions graphically!

  - Easily model, confirm and specify spectral interferences.
  - Specify up to 5 interfering elements per element.
  - Define KLM markers based on analytical or arbitrary selection.
  - Specify off-peak positions with a single mouse click.
  - Changes to off-peak positions are automatically saved.
  - Extensive modeling of background fitting options.
  - One mouse click to apply new models to any or all samples.



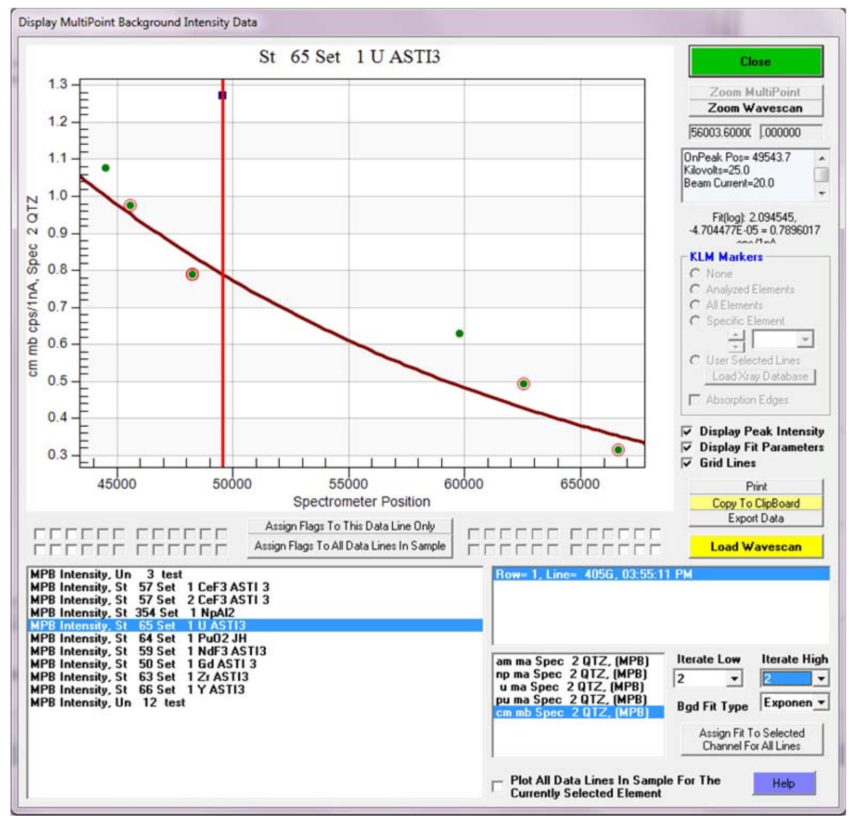
- Output any or all data and calculations to plots or Excel spreadsheets!

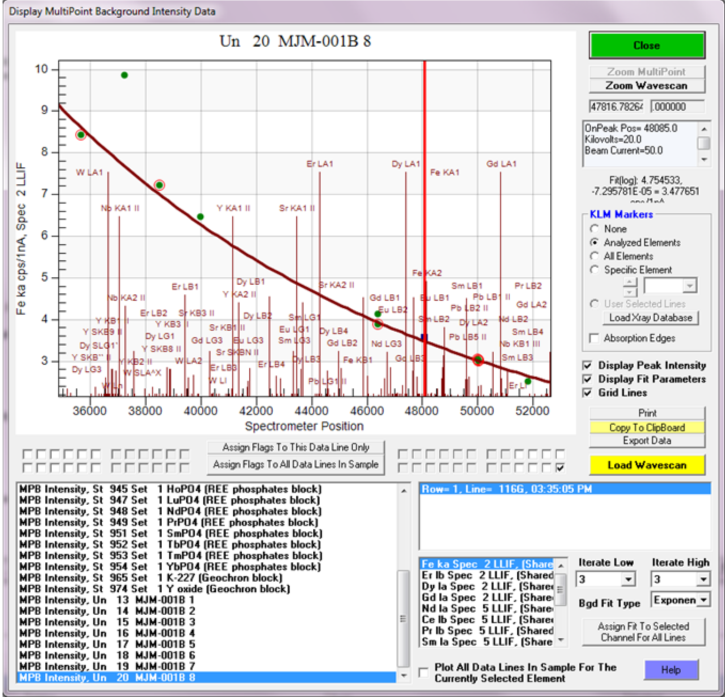
  - Manual or automatic linking to Excel spreadsheets.
  - Export standard, unknown or wavescan data to Excel.
  - Display analytical data in column or row format.
  - Use pre-defined, manually selected or custom output formats.
  - Export thin film and raw data formats.
  - Automatically plot all data for reports.
  - Export to tab delimited text or copy to clipboard.
  - Export all data types: images, EDS, peaking, PHA, etc.



- Utilize the state of the art background corrections with multi-point and "shared" backgrounds!

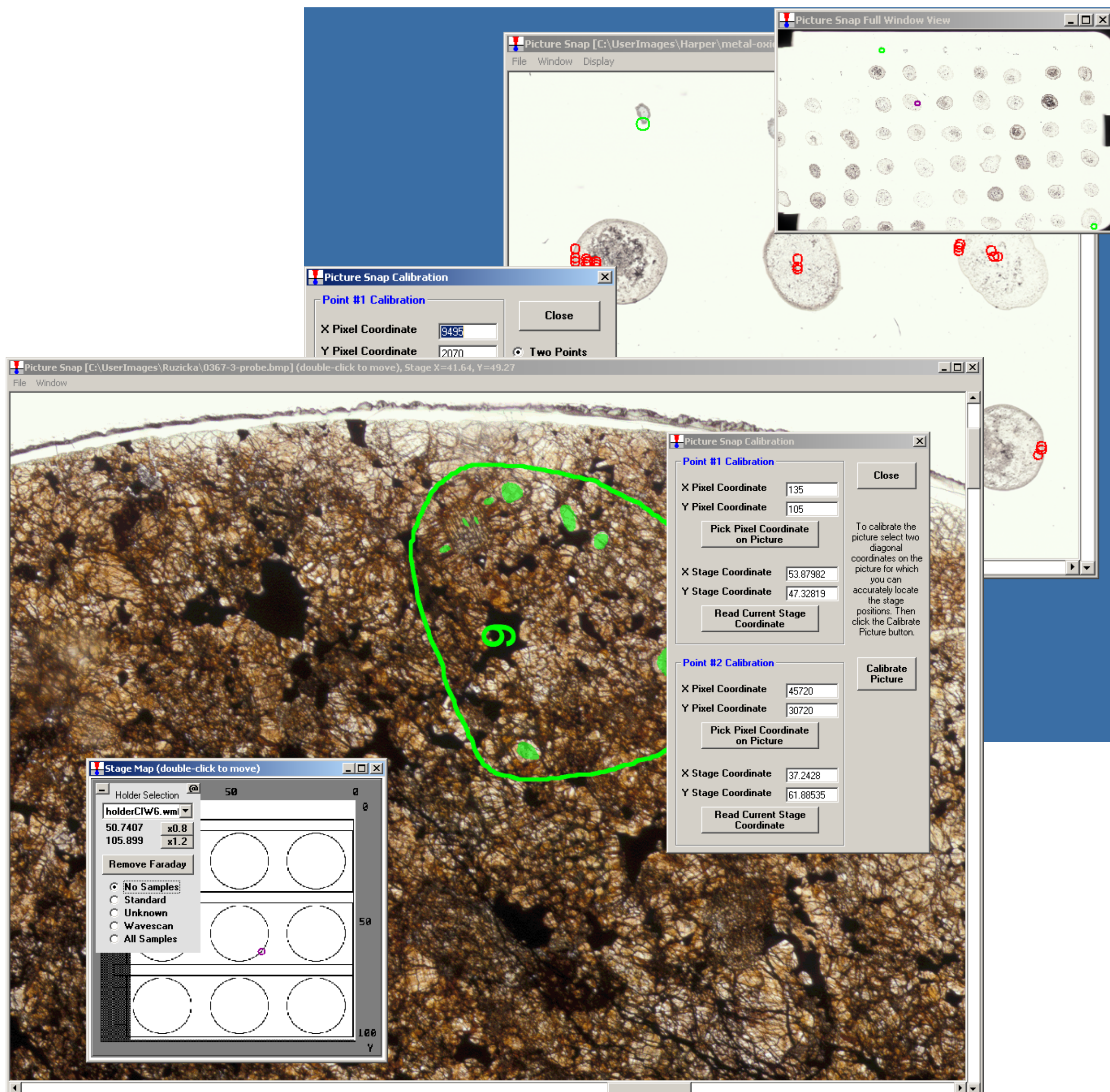
  - Utilize up to 12 off-peak background posaitions on each side of the peak.
  - Or "share" background positions from other elements for elements which were acquired using the same spectrometer and crystal.
  - Perform graphical analysis of your backgrounds using linear, polynomial and exponential fitting methods.
  - Perform all these procedures during on-line acquisition or in off-line post processing.





1. New PictureSnap! Easy Sample Navigation Feature

- Import any image from any slide or flat bed scanner and quickly calibrate the image to your stage coordinates with two mouse clicks (three clicks for round samples)!
- Navigate the sample by simply clicking on the sample position!
- See where you are at all times using the live stage cursor!
- Display analyzed sample coordinates and point and line number labels directly on the image!
- Print or save to file or clipboard a high resolution optical image showing where your analyzed positions are located- directly on the sample!



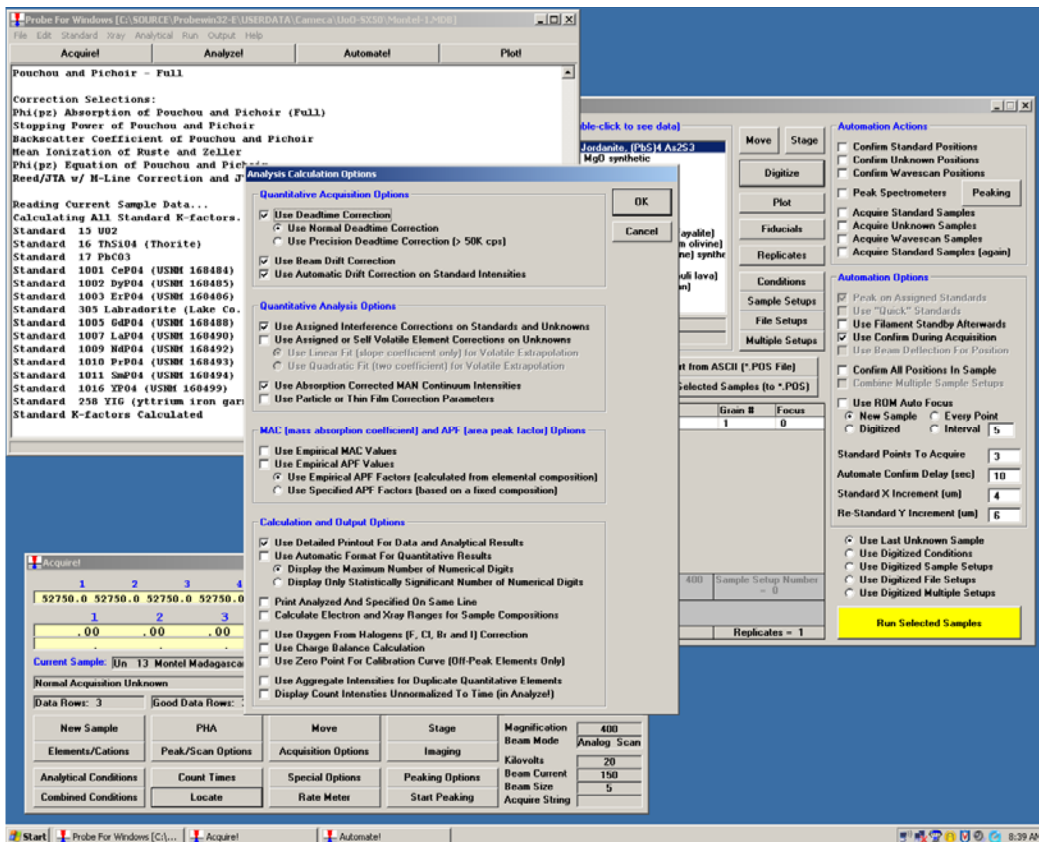
A cool feature that makes it easy to digitize, acquire and display analytical data, even on complicated and fine grained samples!

1. Native TCP/IP Support for Cameca SX100 and JEOL 8900/8200/8500

- Allows both Probe for EPMA and OEM software to be connected simultaneously to the SX100 and 8900/8200/8500 without re-configuration or re-connection. Now you can have the powerful PROBE algorithms running on your new JEOL or Cameca instrument!

- Allows maximum flexibility for acquisition, automation and analysis. Remember, Probe for EPMA has an unlimited redistribution license for off-line processing! Everyone who acquires data with your instrument can have a copy for off-line analysis of their data.

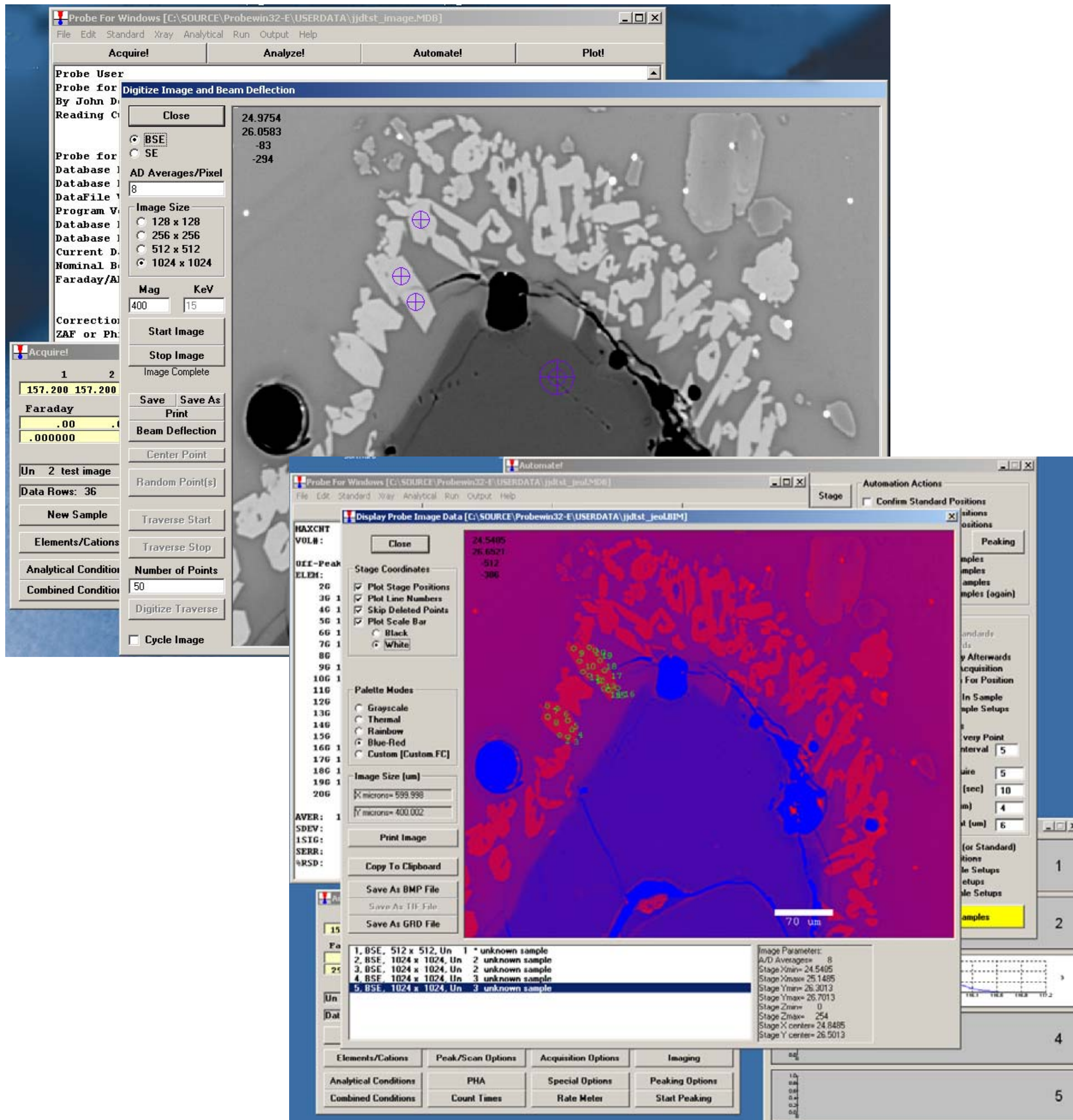
- Now with NIST's latest FFAST (Chantler-2005) mass absorption coefficients for best accuracy!
- Utilize PROBE for EPMA's unique, easy to use and automatically iterated truly quantitative interference correction!
- Utilize PROBE for EPMA's easy to use graphical volatile element and alternating background acquisition!
- Utilize PROBE for EPMA's unique statistical output feature to only display statistically significant data and digits!
- Utilize PROBE for EPMA's unique high accuracy halogen matrix correction for dealing with oxygen equivalent of halogens when calculating oxygen by stoichiometry and much more!



No instrument hardware or network configuration changes are required to run Probe for EPMA. Simply add a PC, install the software and connect a network cable to your existing hub!

2. Fast and Easy Integrated Analog Imaging

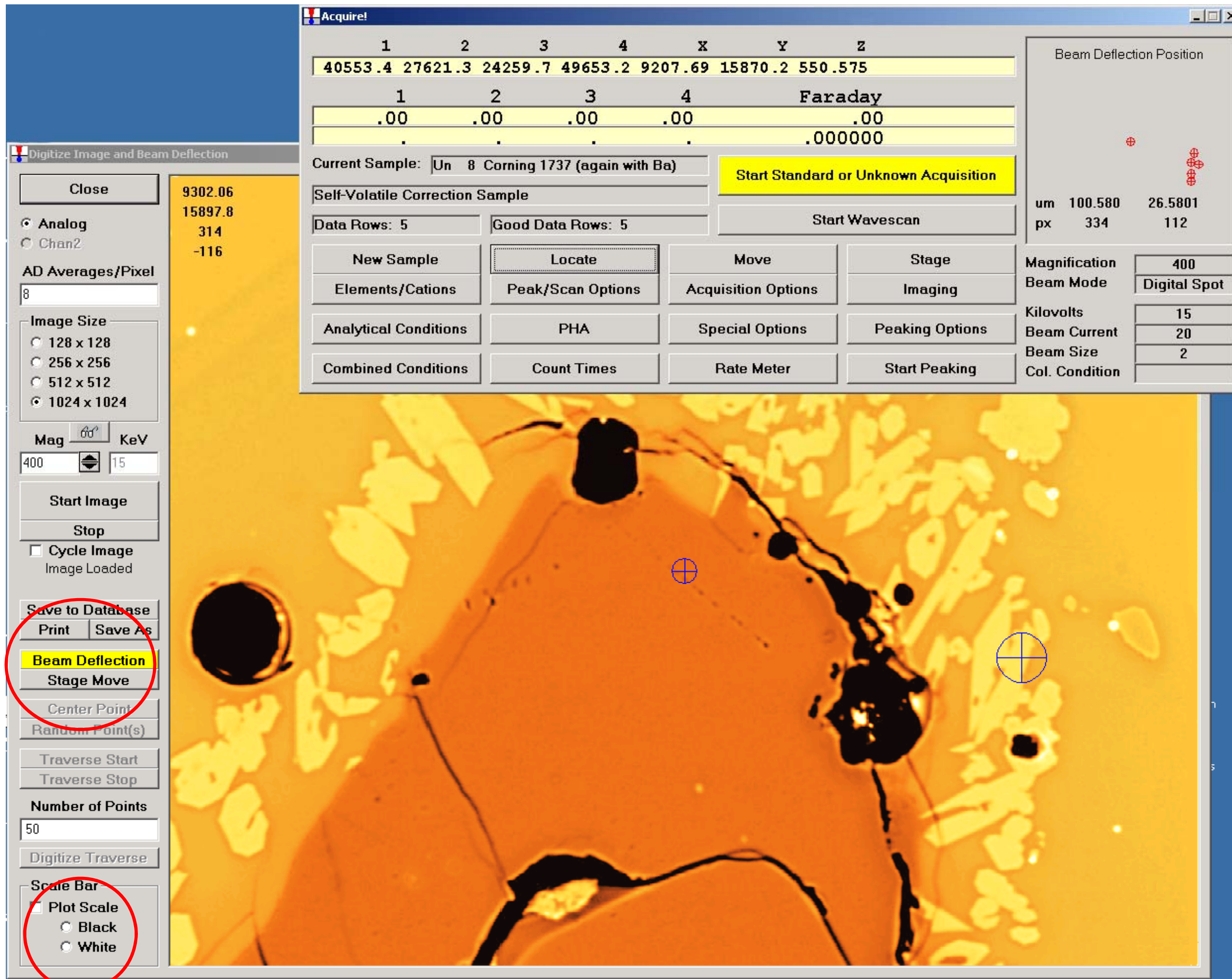
- Both manual and automated image acquisition modes on standards, unknowns and wavescans.
- Images are tagged to analytical samples.
- Analytical position coordinates are plotted on image overlay.
- Standard and user defined display palettes (LUT).
- Integrated scale bar in black or white.
- Enhanced image digitizing of coordinates for stage or beam deflection acquisition.



Fully integrated manual and automated analog imaging for precise beam control, digitizing and documentation of sample analyses.

3. Realtime Beam Deflection and Column Condition Display

- Graphical display of current beam deflection position (manual and automated).
- Realtime display of current column conditions and beam scan modes.
- Realtime display of user defined acquisition macro-commands.



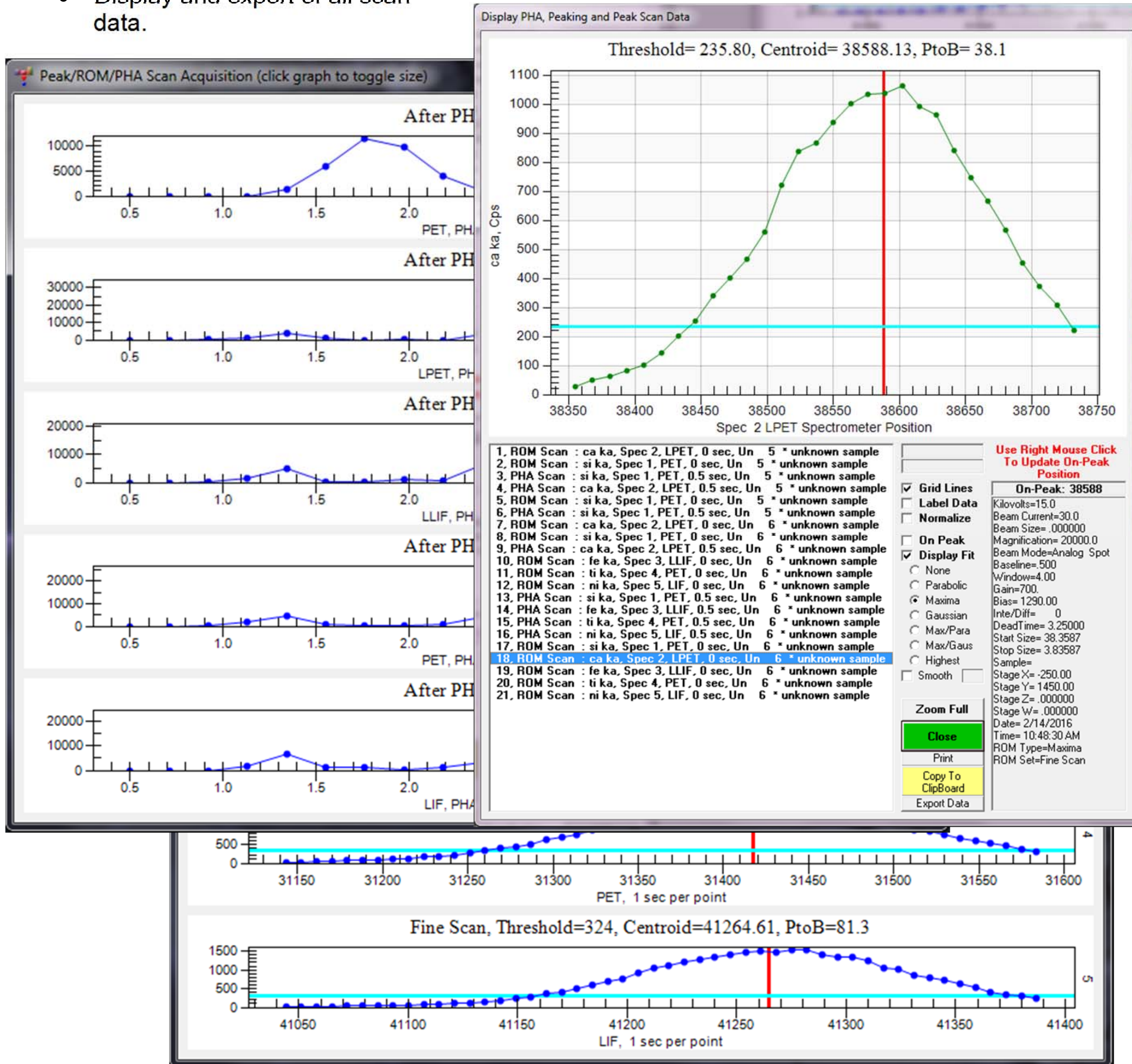
Observe a graphical display of your beam deflection coordinates in microns and pixel units for both manual and automated beam deflection acquisitions.

Use the graphical stage move to re-center the beam and move the stage to the exact sample position based on the displayed image.

Live mouse cursor for instant stage coordinate readout.

4. Automatic Recording of Scan Data

- Automatically acquire and save all PHA, bias and gain detector scans.
- Automatically acquire and save all ROM peaking and pre and post peak scans.
- Display and export of all scan data.

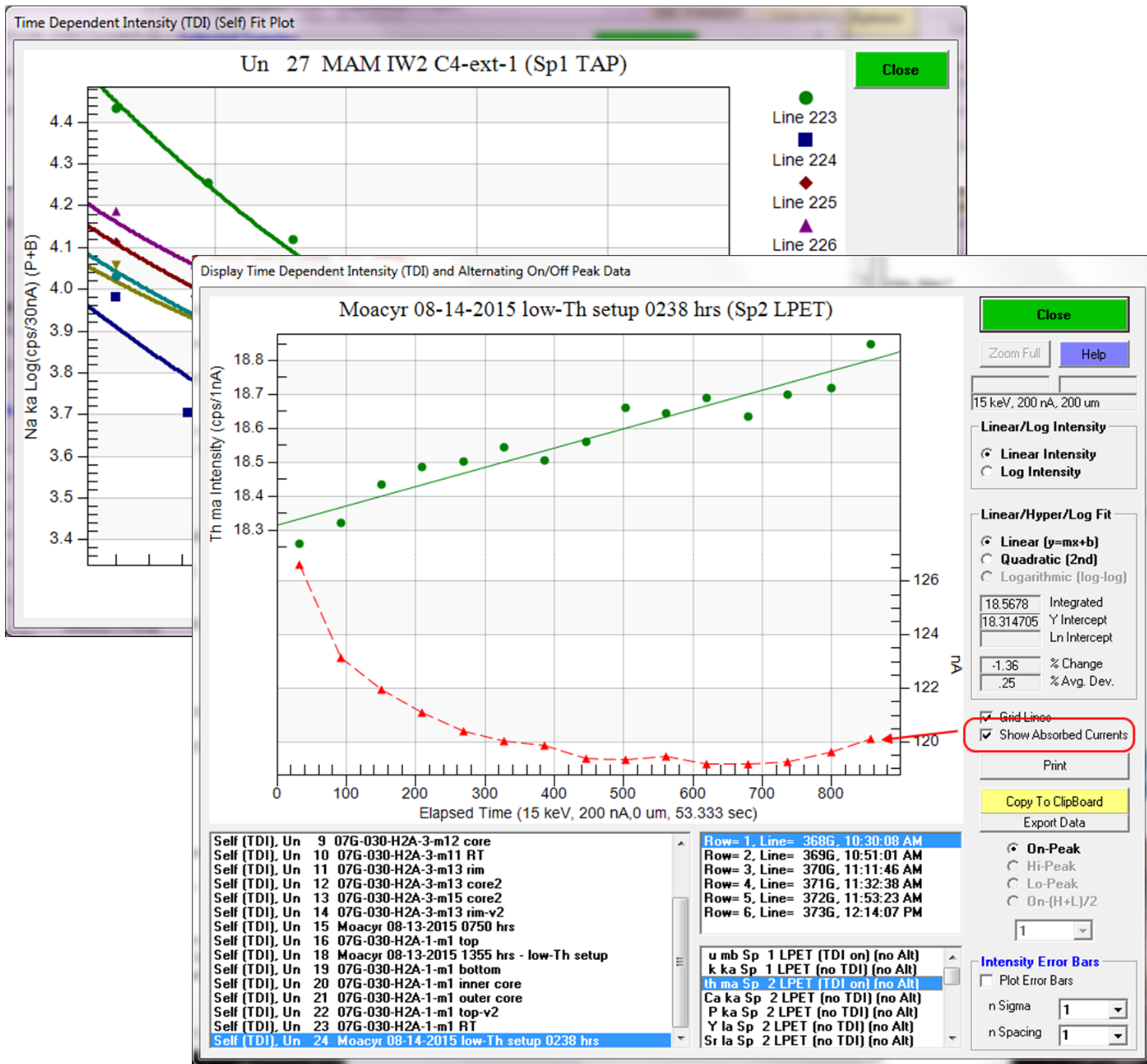


Have a complete and permanent record of all instrument calibrations including PHA and peaking procedures and intensity data in each user database.

All scans including ROM peak scans are tagged to the specific data file samples for accurate referencing of instrument adjustments.

5. Automatic Recording of Volatile and Alternating On/Off Peak Intensities

- Automatically record all volatile calibration intensities.
- Automatically record both on and off-peak (alternating) intensity data.
- New high accuracy (quadratic exponential) fit for large volatile loss or gain.
- Display and export to ASCII file for external re-processing and plotting.



Easily correct for sensitive samples by automatic acquisition and correction for intensity changes over time by correcting for both intensity loss or gain.

For extended acquisition time on trace elements, use the alternating on and off peak acquisition to integrate the peak and background intensities repeatedly and monitor long term trends in intensity changes.

6. Enhanced Wavescan Display Plotting

- Resizable plot window for clear readability.
- Display up to XX (20th) order lines (new NIST x-ray database).
- Spin buttons for fast graph zoom and pan.
- Improved KLM peak labels.

Plot wavescan intensities and select off-peak positions with two mouse clicks on the graph control. Changes are automatically recorded to your user database.

7. Row and Column Display of Analytical Results and Match Capability

- Display both element column and elements row display formats at the same time with all specified data types.
- See all results, elemental, oxide, atomic, formula, intensity in one easy to read format.
- Copy to clipboard and paste into any document or report.
- Match unknown compositions to complete mineral, NIST and other databases.

Analyze Data

Un 3 GSC-4170 gr5
TO = 40, KeV = 20, Beam = 150, Size = 5

Analytical Data Line: 304, Status = Good (Undeleted)
Line: 3 of 5
Acquisition Date/Time: 06/09/2000 03:58:58 PM

Copy	K-Raw	Counts	Elemental	Oxide	Atomic	Formula
Ca	.08426	1340.0	.776	1.086	.769	.046
Si	.02759	2329.2	.882	1.888	1.247	.075
Al	-.00002	-1.1	.000	.000	.000	.000
Y	.00444	24.4	.324	.412	.145	.009
Pr	.04389	342.9	2.632	3.080	.741	.044
Nd	.15569	1443.8	9.448	11.019	2.599	.156
Sm	.02228	267.2	1.395	1.617	.368	.022
Gd	.01111	157.7	.744	.858	.188	.011
Ce	.40728	2559.9	24.306	28.469	6.882	.412
La	.18523	1001.6	11.213	13.150	3.203	.192
P	.93869	6067.1	12.142	27.821	15.553	.931
U	.00099	12.5	.097	.110	.016	.001
Pb	.00570	62.0	.595	.641	.114	.007
Th	.11283	2084.6	8.963	10.199	1.533	.092
Dy	.00216	34.1	.150	.172	.037	.002
Er	.00021	3.7	.015	.017	.004	.000
O			26.859	.000	66.604	3.989
Sum			100.540	100.540	100.000	5.989

Display all results (k-ratios, intensities, elemental, oxide, atomic and formula), and quickly drill down for more detail with a simple double-click of the mouse.

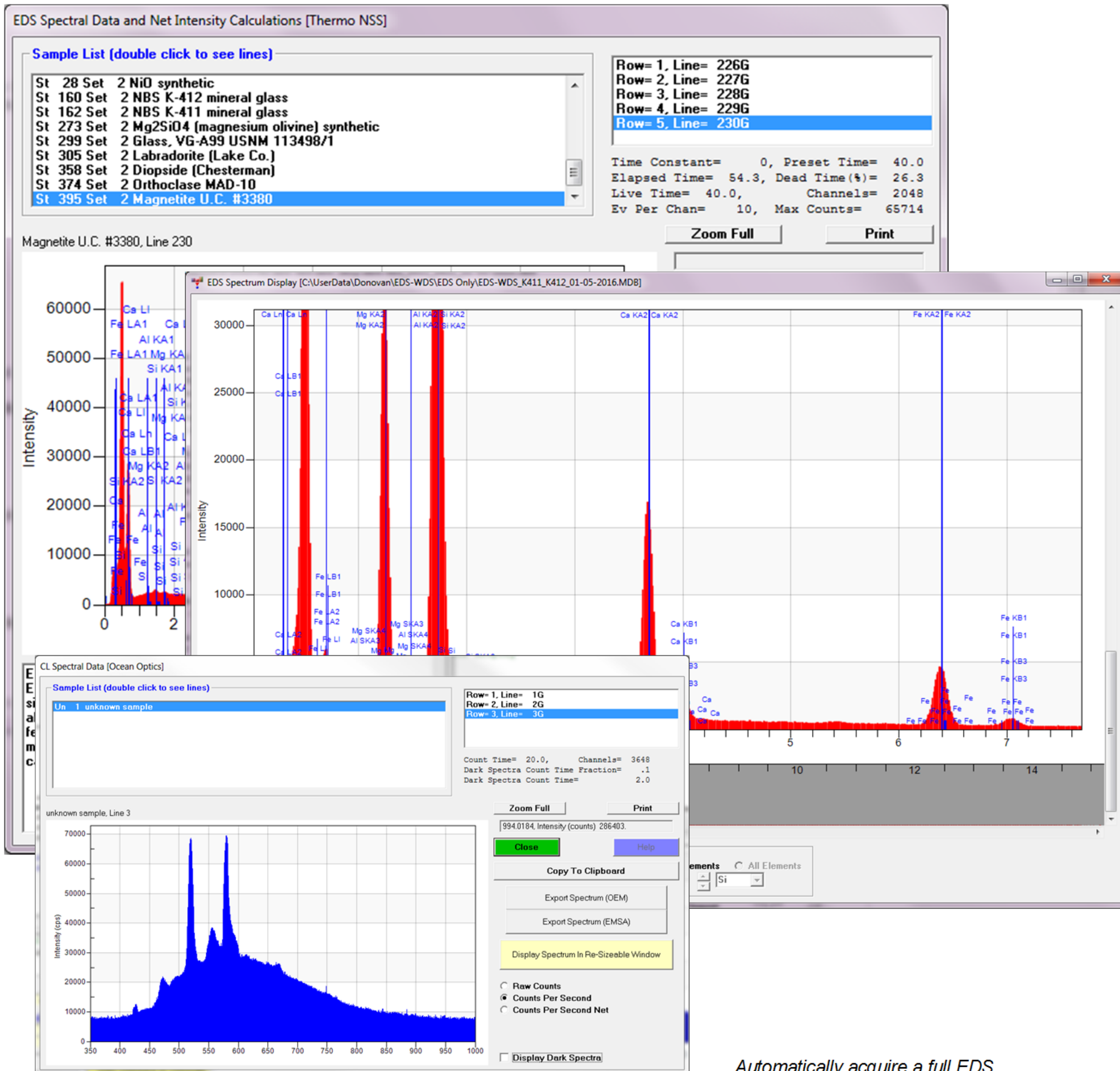
8. Improved PHA Scanning is Automatically Saved To User's Database

- Realtime display of all PHA acquisition data in user database.
- Now scan both bias ranges and gain ranges .
- Export of PHA acquisition data to ASCII file.
- Automated PHA scanning of all spectrometers (Startwin utility).
- Automated PHA scanning before and/or after manual or auto peaking procedures.

Acquire PHA, bias and gain distributions with real time display and automatically save to your user database for complete documentation of instrument conditions.

9. Improved EDS (and CL) Spectral Acquisition and Processing Interface

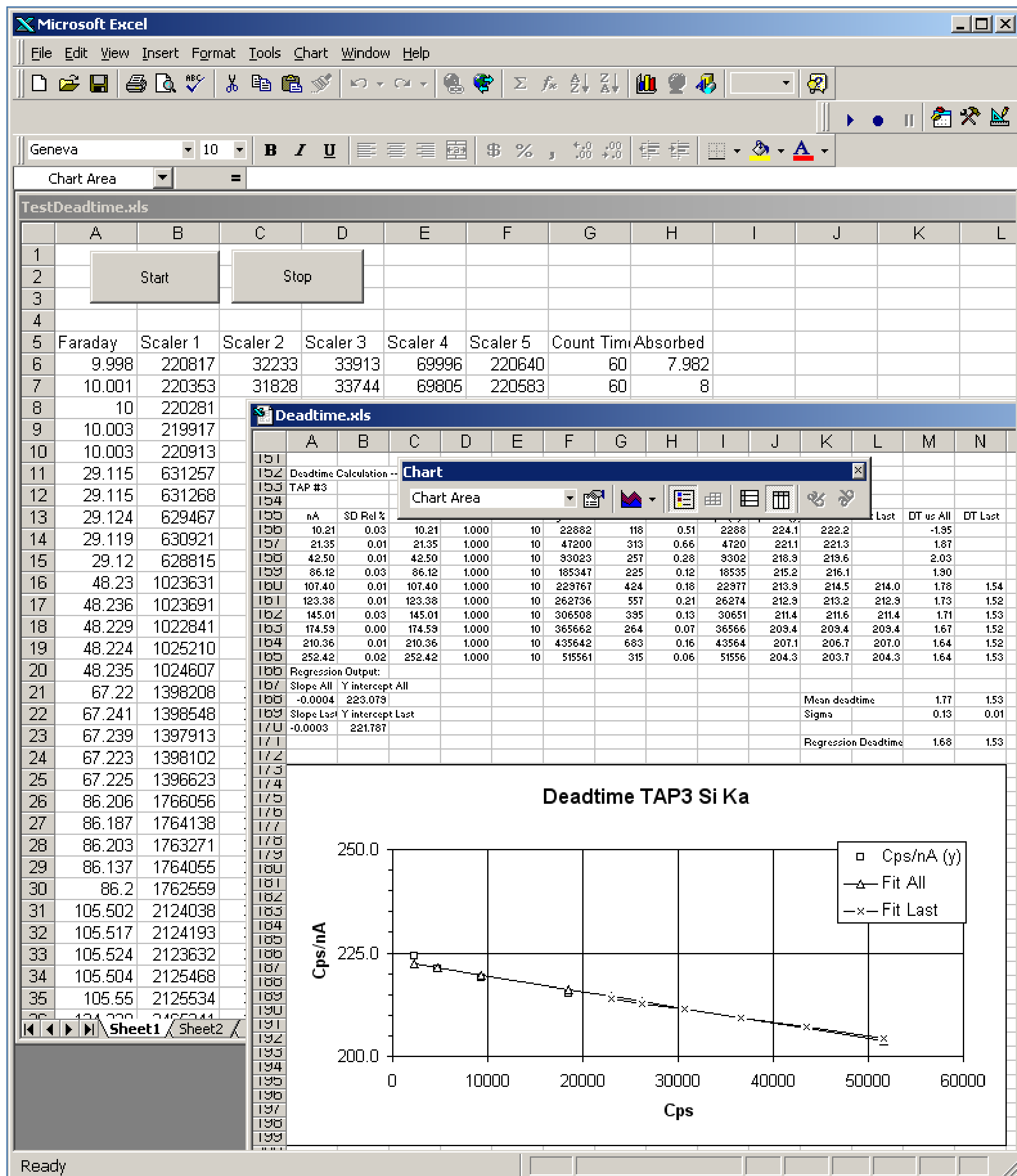
- Supports Thermo, Edax, Oxford and Rontec EDS interfaces
- User definable EDS integration time and EDS application preset time.
- Automatically acquire a full EDS spectrum for each analysis.
- Easily integrate WDS and EDS elements using self-consistent matrix corrections.



Automatically acquire a full EDS spectrum and all necessary detector parameters for complete off-line re-processing of combined EDS/WDS data.

10. Enhanced Excel Remote Automation Interface

- Operate your electron microprobe from Excel!
- Write custom macros for your specific acquisition or test procedures
- Control all instrument parameters (stage, spectrometers, crystal flipping, counting, column, etc) in a device independent fashion.



Automatically calibrate instrument deadtime and detector response curves with supplied Excel macros (written by Paul Carpenter) and modify or design your own!

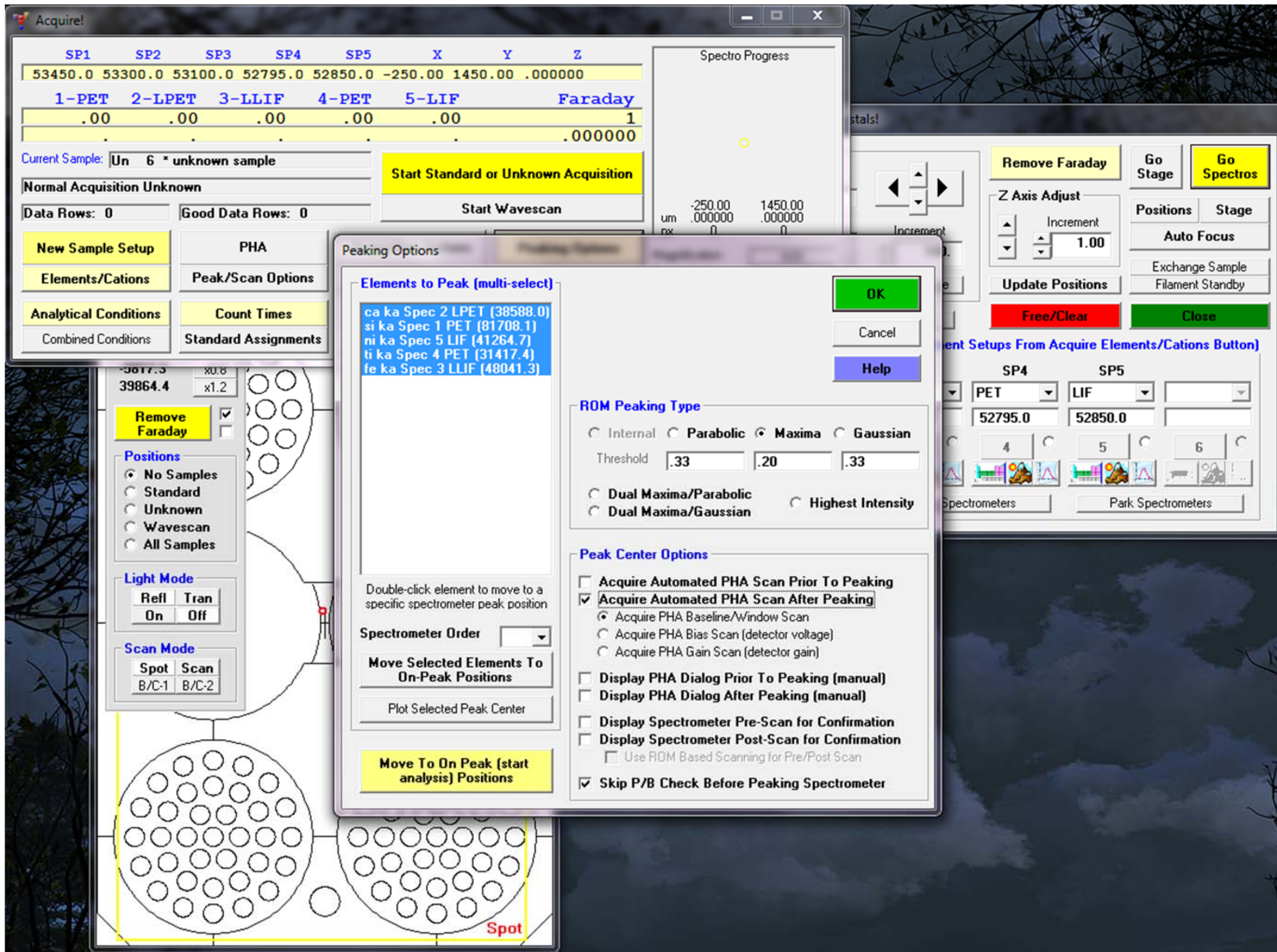
11. Enhanced Elasped Time Predictions

- Shows elapsed time on an element basis for each spectrometer.
- Color coded by x-ray line (R=Ka, G=La, B=Ma) and current crystal.
- Standard, Unknown and Wavescan acquisition times calculated separately.
- Calculate appropriate off-peak integration time statistics for optimum acquisition.
- Show remaining time for automated acquisitions.

Balance spectrometer acquisition load by distributing acquisition time between different elements and individual spectrometers.

12. New Move Spectrometer/Stage Window Controls

- Periodic table element selection with over voltage and spectrometer position data information feedback.
- ROM peaking button for quick and easy tuning.
- PHA tuning button for quick and easy adjustment.



Select, adjust and peak element PHA and spectrometer position quickly with visual confirmation and automatic recording of all data to your user database.

13. New Quick Standard Acquisition Options

- Acquire all elements in all standards (for critical cross checking of secondary standards).
- Acquire normal “quick” standards (automatically acquire assigned elements only) .
- Acquire “smart quick” standards (automatically acquire assigned elements plus major elements in secondary standards).

Acquisition Options

Click Element Row to Edit Acquisition Options

Channel	Element	Spectro	Crystal	Order	Std Bgd	Unk Bgd	Peaking	Nth Point	Nth Interval
1	na ka	1	TAP	1	MAN	MAN	No	No	10
2	si ka	2	LPET	1	MAN	MAN	No	No	10
3	k ka	3	LPET	1	Off Peak	Off Peak	No	No	10
4	al ka	4	TAP	1	Off Peak	MAN	No	No	10
5	mg ka	1	TAP	2	MAN	MAN	No	No	10
6	fe ka	5	LIF	1	MAN	MAN	No	No	10
7	ca ka	2	LPET	2	MAN	MAN	No	No	10
8	s ka	2	LPET	3	Off Peak	Off Peak	No	No	10
9	cl ka	3	LPET	2	Off Peak	Off Peak	No	No	10

1 TAP, 2 LPET, 3 LPET, 4 TAP, 5 LIF — 55 secs

Acquisition Order: Channel Number; Ascending Angstroms; Descending Angstroms; User Defined Order Number

Spectrometer Motion: Asynchronous; Synchronous

Quick Standard Acquisition Modes: Only Assigned Elements; Assigned or Major Elements > 6 wt%

Nth Point Off-Peak Background Options: Use Nth Point Acquisition For Off-Peaks; Use Nth Point Monitor Element Intensity; Element Intensity To Monitor; Percent Change Intensity 5; On Peak Time Fraction 1.00000

Automation Error Reporting: E-mail Notification of Status and Errors; E-Mail Address to Report Automation Status and Errors: epmalab@uoregon.edu

EDS Acquisition [EDS Demonstration]: Acquire No EDS Spectra; Acquire EDS Spectrum Intensities; Help; Note: EDS is not available with "combined" conditions!; EDS Unknown Count Factor 1; Maximum Energy (keV); Pulse Throughput (kcps); Get; Set; Use Preset Time (in EDS application); Use Specified Count Time 80

CL Acquisition: Acquire No CL Spectra; Acquire CL Spectrum Intensities; CL Count Time 80; CL Unknown Count Factor 1; Dark Spectra Count Time Fraction 0.1

Stage/Spec BackLash (only with automation): BackLash Correction on Standards; BackLash Correction on Unknowns; BackLash Correction on Wavescans; BackLash Correction on Spectrometers

Miscellaneous Options: Return to On Peaks After Acquisition; Do Not Set Conditions During Acquisition; Blank Beam After Move and Acquisitions; Measure Absorbed Current On Samples; Measure Beam On Sample Acquisitions; Measure Beam Current On Wavescans; Nth Point Beam Measurement 1; Beam Off During Spectrometer Motion; Use Alternating On And Off Peak Acquire; Load Standard Data From File Setup; Do Not Display Standard Images; Use Last Unknown As Wavescan Setup; Use Unknown Count Time For Interf. Std; Use Decontamination/Incubation Delay; Decontamination/Incubation Delay 0; Auto-Focus Threshold (JEOL only) .33; Use Only Digitized Standard Positions; Use Current Instrument Conditions Always; Use Automated PHA Control; Use MCA PHA Acquisition Hardware

Automatic Analysis and Output Modes: Use Automatic Analysis After Acquisition; Export Weight Percents To Excel Link; Export Raw K-Ratios To Excel Link; Export Counts/Sec To Excel Link; Export Raw Counts (i*t) To Excel Link

Automated Image Acquisition: Acquire Automated Images on Standards; Acquire Automated Images on Unknowns; Acquire Automated Images on Wavescans; Before; After; Both; Use Sample Mag KeV for Automated Imaging

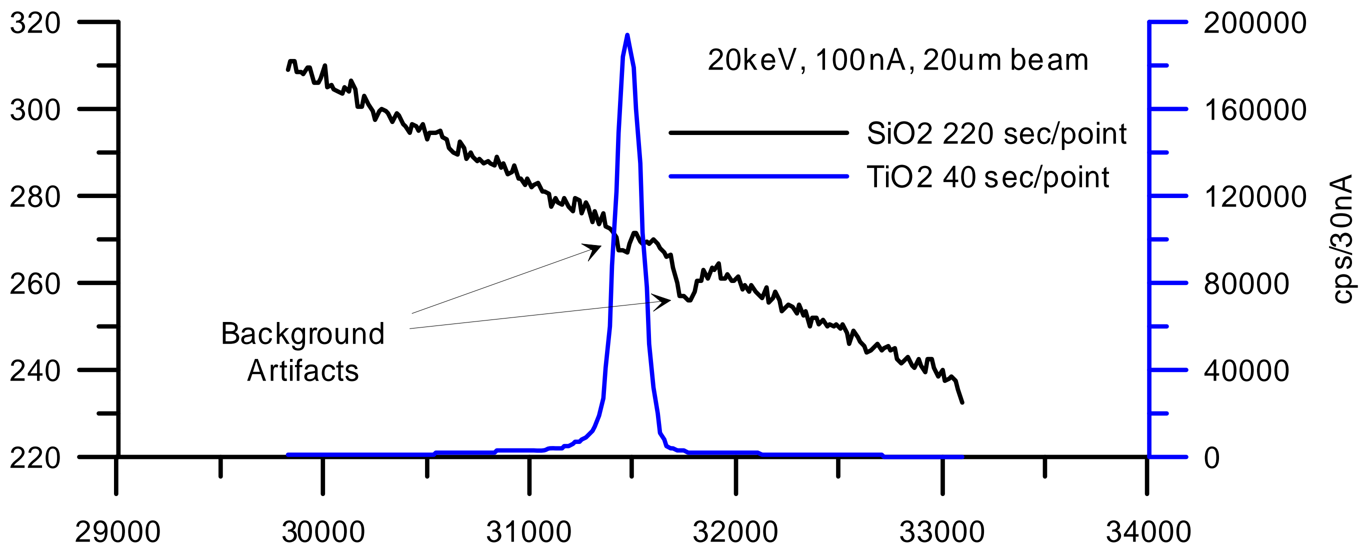
Change All To Off-Peak; Change All To MAN; OK; Cancel

Acquire full standardizations for maximum flexibility or just the elements actually assigned as standards or interferences standards (including MAN background curves).

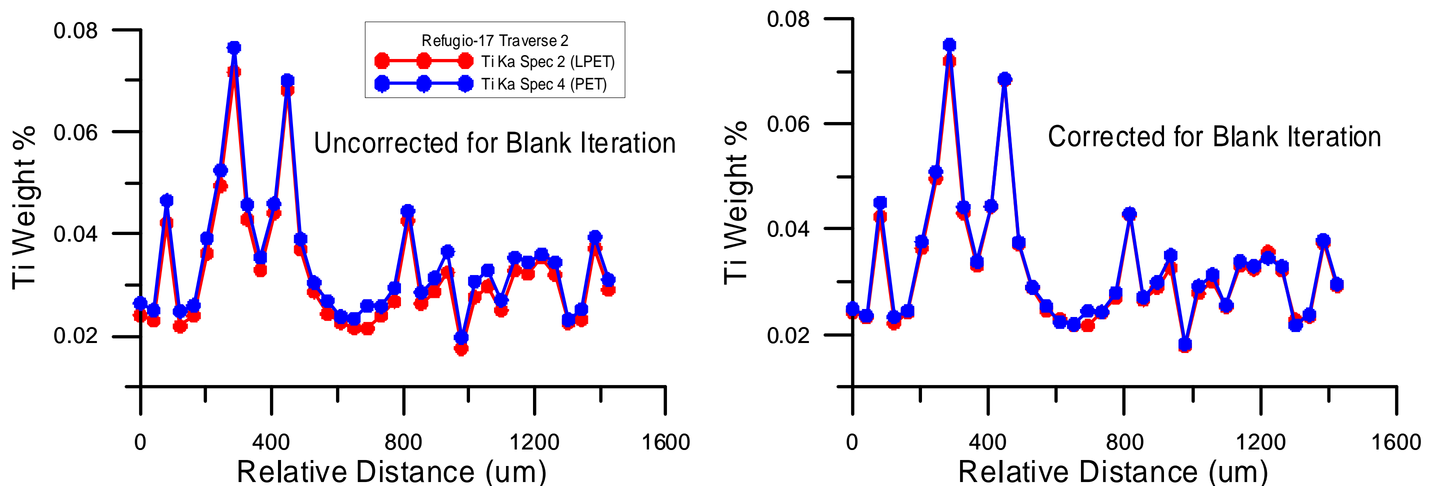
Use the new “smart” option to automatically acquire assigned elements plus any elements higher than a user defined concentration. Use additional intensities to re-assign standards at any time- all in a single portable user relational database.

14. A New Improved Accuracy Correction For Trace Elements

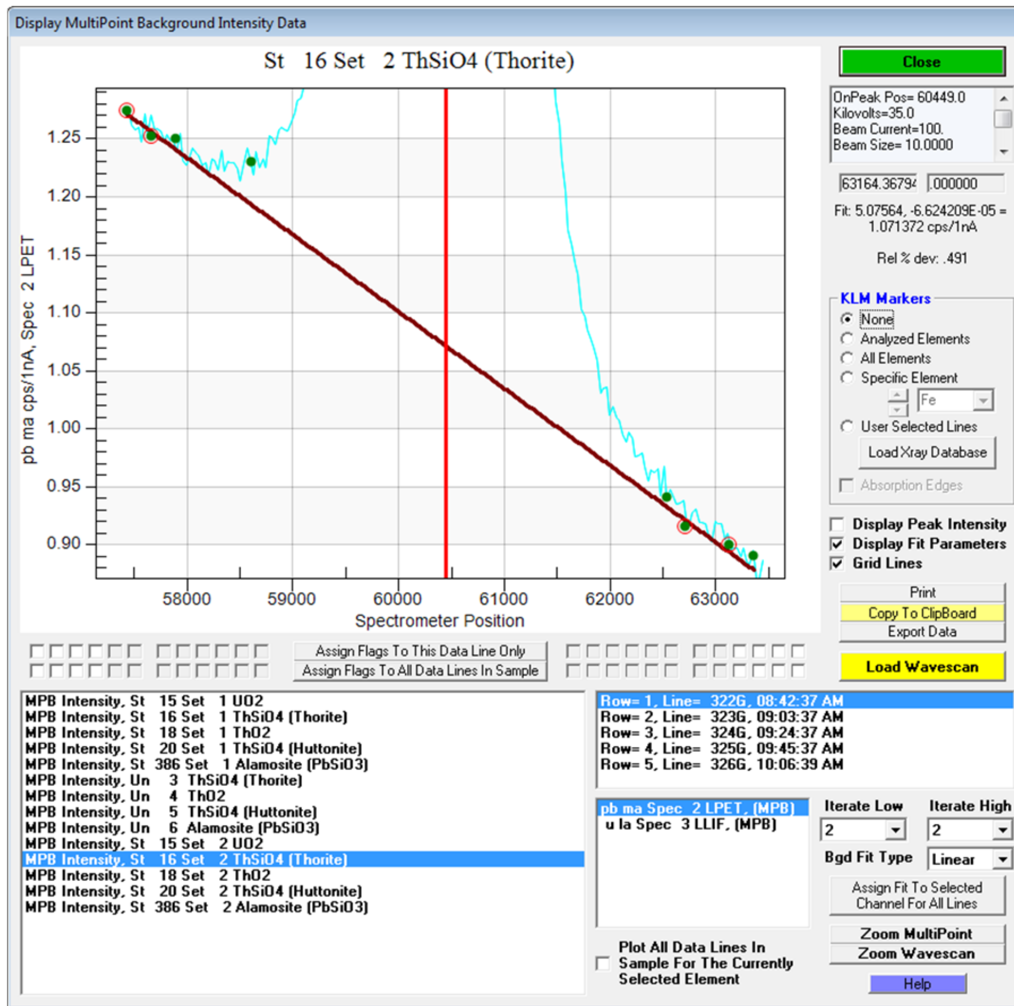
- Modern EPMA instruments equipped with low noise detectors, counting electronics and large area analyzing crystals can now routinely achieve sensitivities for most elements in the 10 to 100 PPM levels. However, because of various sample and instrumental artifacts in the x-ray continuum, absolute accuracy is more often the limiting factor for trace element quantification.



- A new "blank" correction developed for Probe for EPMA can be automatically applied to x-ray intensities during the matrix iteration process to correct for these systematic accuracy errors that are measurable at levels up to 50 PPM depending on particular spectrometer and crystal configurations.
- Trace concentration accuracies even at 500 PPM levels are improved significantly as the following graph demonstrates:



16. New Multi-Point Background Feature



- In materials where the composition is variable or several different phases are present, it is usually necessary to perform many time-consuming spectrometer scans at sufficiently high precision levels to avoid unknown interferences and other continuum artifacts such as “holes” in the background as described by Self, Wark and other workers.

- To handle these situations automatically and accurately, Probe Software has developed new acquisition and calculation methods collectively known as the “multi-point background” feature. This multi-point background acquisition will automatically acquire a number of off-peak intensities distributed on each side of the analytical peak so that at least a few of the background measurements will be unaffected by the unexpected presence of other elements or continuum artifacts that could lead to systematic errors. The background intensity is calculated automatically by iteratively looping on the measured multi-point intensities and optimizing on the best fit of the relative lowest variances until the specified number of valid background positions is reached.

- Above is a screen shot showing this multi-point background calculation for one data point. As can be seen, the off-peak positions closer to the Pb Ma analytical line were interfered by the tails of the Th Mz1 and Mz2 lines (there is no Pb in this ThSiO4 sample). However, the program correctly iterates the multi-point off-peak backgrounds to find the best fit to remove the problematic background measurements automatically.

Contact: John Donovan, donovan@probesoftware.com or call (541) 343-3400 for more information.
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