# THE USER INTERFACE

The LVis user interface has four major parts:

1. Tool bar
2. Menu bar
3. Configuration bar
4. Desktop

**IMAGE MISSING**

## Tool Bar

The tool bar provides quick access per mouse click to different actions within the application. The actions are represented using icons. These actions are not always possible in the current program status. In such cases, the icon is highlighted in gray (no colors).

**Important**
If the actions refer to measurements (e.g., Start, Stop, Analyze, etc.), then the icons are only active if measurements are open on the desktop. If measurements run in the background, meaning that they are not shown on the desktop, then the respective actions can only be activated in the configuration bar by directly selecting the detector. If several measurements are open, the actions (icons) in the tool bar refer to the currently active measurement!

The following actions can be initiated via the tool bar.

**IMAGE MISSING**

### Open File

Clicking the folder icon in the tool bar automatically opens the basic directory of all measurements, which is defined under Settings. Then you can open a .LVM file stored there.

**IMAGE MISSING**

This action is identical to the “Open file” menu item in the menu bar under “File”. As LVis can in general manage several instances at the same time (several detectors can measure at the same time, several spectra can be opened at the same time), this action is always possible, independent of the actual program status.

## Save File

Via the floppy disc icon, you can save an open project (spectrum, spectrum with adjusted analysis parameters or spectrum with analysis parameters, etc.) can be saved as an .LVM file

**Important**
If a name is assigned for this file in the parameter set, then the file will be saved without confirmation prompt into the basic directory, in a folder with the detector name, and there in a folder with the name of the parameter set.

If no name is entered, you must define via a dialog where and under which name the project should be saved (corresponds to the Windows action “Save as”). The possibility to save a project is of course only available, if a spectrum or a measurement is open.

## Analyze Active Spectrum

Using this icon, an active spectrum (hence a spectrum, which is shown on the desktop and is active and was started parameterized, can be evaluated using the parameters defined at the beginning of the measurement.

If for an active spectrum on the desktop the analysis parameters are not available (since it was started manually) you will have to define all parameters manually as well.

Normally this icon can be used to check a running measurement by a preliminary analysis (e.g., if the limit of detection is reached) or to analyze a finished measurement.

## Start Spectrum Acquisition

In order to start spectra acquisition without parameters, click on “Start spectra acquisition”. This is possible if the detector (or the memory content of the corresponding electronic measurement equipment) is active and shown on the desktop. In addition, it is possible to continue a stopped spectra acquisition.

If the memory content is not shown on the desktop, then you can only start spectra acquisition from the context menu of a detector in the configuration bar.

**Important**
For this action it is not important whether the spectrum was started in the memory of

electronic measurement equipment with measurement parameters and has already been evaluated or if the memory is empty. The spectrum currently stored in the memory of electronic measurement equipment is simply continued.

## Stop Spectrum Acquisition

Using this action, you can stop a spectrum acquisition started without parameters (not parameterized). Parameterized started measurements can only be stopped via the context menu of a detector in the configuration bar (Choose “Analyze” — after saving the measurement you will be asked if the acquisitions shall be stopped). This action is only available for spectra, which are currently shown on the desktop and are active.

## Delete Spectrum (manually acquired spectra only)

This command clears the detector memory (hence, the spectrum) corresponding to the currently active spectrum window on the desktop. This only applies to spectra acquisition started without parameters. It does not matter whether data acquisition is currently underway place or not.

## Login (green “padlock” icon)

Click on the green “Open lock icon” to unlock protected functions of the application. This requires the administrator password. If the administrator is logged in, this icon is highlighted in gray.

## Logoff (red “padlock” icon)

If the “Closed lock icon” is active (red) this indicates that the application is currently unlocked. Clicking this icon locks the program.

## Peak Search

Using this icon, you can start a peak search in the currently active spectrum window. The results of a peak search started via the tool bar are subsequently shown in the spectrum. However, they will not be saved and cannot be used for a report. They are only used for a quick verification of the energy calibration. In order to distinguish between analysis results, the peak description always displays a question mark next to the nuclide name. The illustration of the peak search results can be hidden by repeated clicking on the icon in the tool bar.

**IMAGE MISSING**

The peak search basically corresponds to a GammaVision WAN32 analysis without library (or a library

without content), hence to a pure Mariscotti peak search.

**Important**
GammaVision requires a library without entries for this peak search. The used library file Null.lib can be found in the \Config folder under the LVis program directory. Do not delete or change this file, otherwise peak search will not function anymore.

All other peak search parameters required for peak search are different, depending if it is a manually or a parameterized started data acquisition.

If the measurement was started using a parameter set, then the parameters defined in the Spectrum section of the Analysis tab apply:

**IMAGE MISSING**

The results of the peak search are subsequently compared with the entries in the Analysis library defined in the parameter set. The nuclide, whose peak energy is closest to a found centroid and which is inside the specified match width, will be assigned to the peak.

If data acquisition was started manually, the parameters adjusted in the Default.sdf file apply and the comparison is performed using the suspect library defined in the global settings.

**Info**
In case of parameterized spectra, this peak search corresponds to the automatic peak search within the scope of spectrum analysis (see Peak search results).

## Change Sample

This button is only active, when a sample changer controlled by the ORTEC hardware I/O is defined for the currently selected detector. Clicking this button changes the output level on the “CHANGE SAMPLE” output of your ORTEC MCB.

## SampleSetEditor

This button is only active when a sample changer is defined for the currently selected detector. Clicking this button opens the editor for the definition of a set of samples (sample batches), the LVis SampleSetEditor.

### LabJournal

Clicking this button opens the LVis LabJournal.

## Menu bar

The menu bar consists of the following menu items:

**IMAGE MISSING**

Similar to all Windows applications, existing program files (.LVM files) can be opened here. Furthermore, a list of recently used files is provided and you can exit the program. In addition the Crystal Reports Designer Report Editor can be started from here. However this is just possible when no other measurement is active on the LVis desktop (see left screenshot). If an acquisition is currently being acquired or an existing .LVM file is displayed on the LVis desktop the menu is somewhat different because it is now possible to save the active document or save it as a different file (see right screenshot).

**IMAGE MISSING**

### Report Editor

LVis has a built in Report Editor based on the Crystal Reports Designer. The Report Editor can be used to modify existing report templates. Typically all your report templates are located in your LVis database subfolder \Reports10xx (xx = 31 German; xx=33 English; xx= 36 French). Select the *.rpt file that you would like to modify and click open.

**IMAGE MISSING**

**Important**
The names used for the report templates located in your respective LVis database\Reports10xx folder are critical! Do not delete these files. Before you modify one of these reports, don’t forget to make a backup of the original ones. It is possible to add templates for the analysis reports which can then be selected in the respective menu on the parameter sets. All report templates that have a name starting with “Standard” will be listed as available analysis report templates on your parameter sets.

The selected file will be opened in the LVis Report Editor.

**IMAGE MISSING**

Here you can modify your reports. Since the Report Editor is part of the Business Objects Crystal Reports 2011 Developer software that we use for designing the reporting we included the designer in LVis. It works the same way as Crystal Reports itself but offers some limited functionality. Because of the complexity of this software package it is not possible to describe all its features in this manual. The Report Editor is more intended to be used to do minor changes like new headings or activation/suppression of individual subreports.

You can preview your modifications and save your new report templates by using the buttons on the bottom bar of the editor.

If you want a completely new, customized report, contact your local ORTEC representative.

## View

In the “View” menu you can select, whether you would like to display the tool bar and the “status bar”. By default both are active. The status bars is used to display error messages and can be deactivated.

## Windows

Here you can define how windows should be arranged on the desktop. You can select between “overlapping” (Cascade) and “side-by-side” (Tiled).

**IMAGE MISSING**

If more than one window is opened on the desktop, all windows are displayed in a list. They can be directly selected and displayed in the foreground as the active window. See Spectra windows for more information on arranging the windows on the desktop. In addition you have the possibility to show all detectors that are configured in LVis “side-by-side” on the desktop with a single click

**Tip**
Note that all windows on the desktop are listed in the configuration bar under the “Currently open“ section, and can be moved into the foreground by double-clicking their respective entry on this list.

## Settings

The Settings window allows you to define global parameters for the entire LVis system.

### Global Settings

The fields on the Settings dialog are defined as follows:

1. Path to the base directory of all measurement data. Unless differently defined by additional program functions, all measurement data is filed in this directory.
2. Here the path to the GammaVision application is defined. This information is crucial for LVis operation.
3. If your LVis is supposed to import sample data from a LIMS you can specify here the path to the respective directory where the sample information files are located. Importing sample data via automated file exchange requires some customization. If you would like to use this feature contact your local ORTEC sales representative.
4. If your LVis is supposed to export analysis results to a LIMS you can specify here the path to the directory where LVis will save the analysis results files that are to be imported by the LIMS. Exporting sample data via automated file exchange requires some customization. If you would like to use this feature contact your local ORTEC sales representative.
5. Default value of max. half-life correction. If a decay correction is activated in a parameter set, this value defines from which time no correction should be applied. The value defined here is a default value only. You can adjust the value to be used for measurement analysis in the respective parameter set.
6. Besides saving spectra in LVis' .LVM files, it is also possible to save them in the GammaVision .SPC spectrum file format. If this is a general request, this setting can be enabled by activating "Automatic SPC file creation after analysis". SPC files receive the same names as .LVM files and are stored in the same directory (See Item 1).
7. LVis can export the entire measurement data and analysis results into a MS Access database. For this purpose activate "Automatic database file creation after analysis". The database created receives the same name and is stored in the same directory as the .LVM file (See Item 1). This is useful, if you would like to perform further calculations based on the results of an analysis (dose rate calculation, etc.), or if you would like to transfer selected data to a different database (LIMS systems). The structure of this database is explained under "Analysis database structure" in this manual.
8. Analysis algorithm selection Here you can select which GammaVision analysis algorithm you would like to use for the analysis of your spectra. The algorithms differ in general, if it has been specified earlier to receive false positive or false negative results and if the focus is on library-based or mathematical (Mariscotti) peak search. More detailed information regarding the individual analysis algorithms can be found in the GammaVision manual. We recommend either using ENV32 or NPP32 for LVis operation.

**IMAGE MISSING**

1. Activation of library-based peak stripping. More detailed information can be found in the GammaVision manual. We generally recommend activating this function.

2. Definition of the suspected nuclide library Here the path to a library is defined, which is used to retroactively compare unidentified peaks of an analysis in order to propose in the report a nuclide for these peaks. This library is not used for the actual analysis and thus can contain significantly more nuclides.
3. Simultaneous measurement support activation with several detectors using parameters sets of the same names (multi-detector configuration). Here you can define the storage location of these multi-detector measurement data as well as the automatic file name generation. For further information, please refer to Multi-Detector Configuration.
4. It is also possible to adjust several input field labels in order to better correspond to the actual laboratory setup. The labels proposed here are default values only. You can adjust the names to be used for measurement analysis in the respective parameter set.
5. Automatically open geometry list of a detector in the configuration bar (in case of many geometries or detectors, it is expedient to suppress this functionality!)
6. Parameters for automatic file name indexing. Here you can define number of digits, start value and validity period of indexes. Automatic indexing in file names can be used in the parameter set by adding $i$ in the name field (seeEdit parameter set).
7. Activating PDF Support can be done by ticking this box. If ticked, the analysis reports will automatically be saved as pdf files and displayed in the default pdf viewer.

**Tip**
Note that when PDF Support is activated, reports will not be sent automatically to your default printer. They will be displayed on screen and saved in the same location as the measurement .LVM file.

1. When the use of the LVis user management “Uli” is desired, it can be activated here by entering a valid IP address. In cases when the user management configuration is supposed to be on the local pc, enter 127.0.0.1.
2. If LVis shall automatically log out a user after a certain idle time, simply enter a time in seconds here.
3. If measurements shall be approved before being published (eg. results exported to a LIMS or QA measurements being transferred to the LVis detector QA database), tick this box. (see Approval of Measurements and Analysis Results for more details)
4. In case you are using the free software EFFTRAN by Tim Vidmar (www.efftran.com) for the calculation of true coincidence summing factors or efficiency transfer, it is possible to automatically have LVis combine all necessary information about the geometrical setup and trigger the calculation. To do this simply enter here the EFFTRAN and MEFFTRAN file locations. More information can be found in chapter Using EFFTRAN with LVis
5. Clicking on the “Units” and “Labels” buttons takes you to the respective menus, where you can define default values for the pull down menus available in the parameter set. (for further information refer to the following chapters)
6. Under “Peak search” you can define peak search parameters that will be applied if no other respective parameters were defined (if e.g., spectrum acquisition was not started parameterized). The adjustment options correspond to the options in parameter sets.

**IMAGE MISSING**

**Important**
Your changes will only be applied if you are logged in as the administrator, i.e., if you have unlocked the application

### Pre-Defining Sample Size Units for Parameter Sets

### Pre-Defining Users, Sample Descriptions, and Sample Locations for Parameter Sets

LVis lets you choose sample size units offers the option the select the different units in a parameter set (activity unit, sample weight, reference quantity) via the pull-down menu.

**IMAGE MISSING**

For this purpose, several commonly used units are predefined. However, you can add any number of units, which can then be selected in a parameter set.

**Important**
Newly added units are only available after their setup in the parameter sets has been completed. Measurements and parameter sets that are open, when the new unit is created, will only offer the new unit, once they are closed and opened again.

You reach the respective menu by clicking on the “Units” button in the global Settings window.

**IMAGE MISSING**

A factor is displayed next to each unit. This factor defines the ratio between this unit and already existing or basis units (which has a factor 1).

**Info**
Liter corresponds to a factor of 1, $m^3$ corresponds to a factor of 0.001, and 1000 liters correspond to 1 m3.

In order to add a new unit, simply click on “New”. The following window opens:

**IMAGE MISSING**

Enter the respective unit description as well as the corresponding factor, then click on “OK”

**Tip**
You can also add further explanation to your units. For example, you can differentiate between dried (dry mass) and untreated samples (moist mass). This can easily be indicated in the sample reference unit by using kg (DM) and kg (MM).

## Pre-Defining Users, Sample Descriptions, and Sample Locations for Parameter Sets

In LVis you can provide a number of descriptions per measurement. Some of these descriptions can be predefined, so that you do not have to enter them over and over again, but can simply select them from a pull-down menu. To do this, click on the “Names” button in the global Settings window to open the following dialog.

**IMAGE MISSING**

LVis lets you pre-define, or add to pre-defined, lists of user names, sample categories, and sampling locations from pull-down menus used in the parameter set window. “Category” helps to summarize different measurements into individual groups. “User” indicates the person who measured the sample. This input field can however be named differently by clicking in the field above the table. The same is true for the last category whose default label is sample Location (or sample origin). In the above picture, this was changed to “Sample Type”. Note that for parameter sets that are linked to an external database, the Location field will be used for the selection of a dataset and will hence not display the entries listed here!

In addition, you can specify, for each type of entry, whether it is a mandatory, “Required” field that must be entered into the parameter set by the user prior to any measurement analysis. You can also assign each name or description with an alias (Shortcut), which can be used in the parameter set for automatic file name generation using the dollar commands $U$ for user, $C$ for sample category, and $L$ for the sample location. For further information, refer to Edit parameter set and the table of dollar commands. In order to add a new name or description, click on “New” beneath the respective table. The following window opens:

**IMAGE MISSING**

Enter the name or description with its corresponding abbreviation, then click on “OK”.

**Important**
Newly added units, names, and descriptions become available for use once data entry on the Settings dialog is complete and the dialog is closed. Measurements and parameter sets that are open when a new description is created will only offer it in the respective pulldown menus after they are closed and opened again.

## Editors

Besides the spectrum itself, the calibration and the analysis settings several additional information is needed for a gamma spectroscopic analysis. Mainly this is the nuclide or analysis library which is essential for spectrum analysis but there is other additional information that may eventually be needed for a thorough analysis like eg a correction library that allows to apply peak and/or nuclide specific correction factors to the analysis, a geometry correction that applies energy specific changes to the efficiency curve or a background correction which subtracts counts from identified peaks to compensate for nuclides present in the system and not the sample. In LVis these additional information is saved by use of additional files that can be created and edited via special “Editors” that can be accessed and started from this menu.

**IMAGE MISSING**

### Analysis Library Editor

In general, LVis uses the GammaVision nuclide library format .LIB and you can certainly make use of the external GammaVision editor program, LibEdit.exe, to create and edit ORTEC .LIB-format library files. (The library editor is installed by default in C:\Program Files\Common Files\ORTEC Shared\LibEdit.).

**Important**
It is currently not possible to use Nuclide Navigator database libraries in LVis!

Besides the GammaVision editor it is possible to create and modify library information within LVis. This can either be done from “Editors” in the Menu Bar or from within a specific LVis measurement LVM file (the herein created library can be exported in the .LIB format so that it is available for use in parameter sets. This is explained in detail in the chapter Modifying the internal nuclide library of an LVis measurement file of this manual).

All library files are saved by default to the library folder in your LVis database directory.

**Important**
Besides calibration, the nuclide library is the most important information you provide to the program for spectrum analysis. Thus, diligence is required in creating it. A library must be tailored for the measurement task. It does not make sense to add each isotope from the map of nuclides. In most cases it also does not make sense to specify every line up to a transition probability of a few per thousand or include low-energy peaks or x-ray lines.

**Tip**
If you are not sure about the “needs” of your application, start with a “coarse” library and refine the data in the library later using the possibility to adjust working libraries in an LVM file for testing (see Modifying the internal nuclide library of an LVis measurement file).

Selecting “Analysis library” under Editors in the LVis Menu Bar opens a dialogue to open an existing library file for modification. It will always come up with the default library folder in your LVis database directory.

**IMAGE MISSING**

If a library shall be created from scratch, simply don’t select a file here and click “Cancel”. The library editor itself looks like this:

**IMAGE MISSING**

You can “Load” or “Add” the data from an existing library, you can “Save” and “Print” the library.

**Important**
Adding data from a library will add all data for all nuclides that are not existing in the currently open one. The information about nuclides that are already existing will be maintained.

To add a single nuclide to the library simply right click into the white main area of the editor and choose “Add Nuclide”.

**IMAGE MISSING**

This will bring up the following dialogue:

**IMAGE MISSING**

Here one can either enter a nuclide name, halflife and uncertainty manually and define then in a subsequent window all the different peak energies with their respective emission probabilities or one simply enters a name and imports the nuclide with all of its data from an existing ORTEC library or from the LARA database (http://www.nucleide.org/Laraweb).

**Info**
The nuclide uncertainty does not refer to a single peak, but the entire nuclide. The 1-sigma uncertainty entered here is calculated in square in the total uncertainty of the nuclide activity. This is the 1-sigma uncertainty, which you can also find in the report and in the Analysis results tab (1-sigma total uncertainty of nuclide activity = square root (counting uncertainty2 + nuclide uncertainty2 + calibration uncertainty2). If you want to be very accurate, enter the total uncertainty of the emission probabilities of all peaks, which are listed in the library, plus the half-life uncertainty. However, in most cases, calculating the total uncertainty based on the transition probability uncertainty of all key lines and the half-life is sufficient. The default value of 5 % is relatively high. Depending on the nuclide and the listed lines, values between 0.1 and 10% are realistic. If you cannot find any uncertainties in the reference books you are using, then you can enter 0.001 (0 is not a permitted input). This means that these uncertainties will not have any real impact on the calculation of the nuclide activity uncertainties.

The LARA database is published by the French “Laboratoire National Henri Becquerel” which is – at least to our knowledge – using all the reviewed nuclear data from the DDEP, the Decay Data Evaluation Project. An international collaboration that was formed in 1995 which includes members of the BNM-CEA/LNHB (France), PTB (Germany), INEEL (USA), KRI (Russia), LBNL (USA), NPL (United Kingdom) and CIEMAT (Spain), with the objective of providing carefully produced recommended data (http://www.nucleide.org/DDEP_WG/DDEPdata.htm). In order to be able to import data from the LARA database a valid internet connection is required.

**Tip**
In rare occasions you might experience problems when importing nuclide data from LARA so that you receive error messages like “Unreasonable answer from LARA” or similar. In these rare occasions it usually helps when you browse to the LARA page and select the respective nuclide for display, then try to import again.

When importing data from either an ORTEC GammaVision library or LARA, one can limit the number of

peaks that are imported by applying filters for the energy and the emission probability so that just peaks with energies being within the selected energy range and above the specified emission probability will be imported.

Every nuclide in the library will be listed in the editor. One can modify the nuclide information by right clicking on the respective entry and selecting “Edit”. From this menu it is as well possible to “Delete” the nuclide or “Add Peaks” to this nuclide.

**IMAGE MISSING**

Using the “Photon Properties”, you can define the energy assignment, e.g., if it is a gamma or x-ray quant, or an escape peak. In addition, you can specify a “Peak Flag” that specifies whether the activity (peak activity) determined from this energy should be included in the average determination for the total nuclide activity.

**Important**
You can define so-called “key lines.” Key lines must be found in a spectrum to identify a nuclide. The peak on level 1 will be automatically set as the key line.

For more detailed instructions on using the library editor, see the GammaVision user manual.

### Correction Library Editor

Correction libraries (*.lvf files) can be used to apply corrections to either the peak emission probabilities (peak specific corrections) or the reported total nuclide activity (nuclide specific corrections). The basic idea behind correction libraries is that eventually needed sample type or detector specific corrections like those for true coincidences for example that usually would be taken into account by manually modifying (correcting!!) analysis libraries are automatically applied while still being able to report the uncorrected values as well as the correction factors (for more seeCorrection Libraries(LVF Files)).

The structure of a correction library is very similar to the one of an analysis library. However instead of halflives and emission probabilities, simple factors are defined for either a nuclide or a peak. Peak Corrections are applied by multiplying the emission probability in the analysis library with the correction factor of the correction library so if e.g. the 1332 keV peak of Co-60 has to be corrected by 10 % due to true coincidence summing out, a factor of 1.1 would have to be defined in the correction library for this peak. If however eg the nuclide activity of Cs-137 should be doubled simply define a nuclide correction factor of 2.

A correction library can be created manually or edited by selecting “Correction library” under Editors in the LVis Menu Bar. This opens a dialogue to select an existing correction library file (*.LVF) for modification.

**IMAGE MISSING**

Note that instead of solely *.LVF file formats, it is as well possible to open a standard GammaVision library *.lib or a (M)EffTran correction file (gv.txt) as a correction library. Usually correction libraries are linked to a detector which is why they are best stored in a subdirectory named “Corr” in the LVis database directory of the respective detector. These folders are created automatically in each detector folder by LVis, however only when a correction library is created from within an LVM file so that the detector is known, the editor points to the respective directory, otherwise it will be the default library folder.

The correction library editor looks very much like the nuclide library editor. It is possible to load or add data from an existing correction library as well as from an existing GammaVision nuclide library file *.lib or a (M)EffTran Correction file (gv.txt).

**IMAGE MISSING**

When loading a GammaVision library (*.lib) as a correction library one can set all nuclide and peak correction factors to 1 by clicking “Neutral”.

Right clicking on a peak energy or a nuclide name will bring up a context menu from where an entry can either be deleted, manually added or and existing entry can be modified. The respective editor for the nuclide and peak specific correction factors are shown below.

**IMAGE MISSING**

**IMAGE MISSING**

An additional uncertainty can be defined for the library correction. It is applied to the nuclide uncertainty from the analysis library (see Nuclide Uncertainty Estimate).

### Peak Background Correction Editor

Peak background correction (PBC) is used if an isotope in the sample is also contained in the background. The correction subtracts counts in a peak resulting from the background, from the measured spectrum (for more see Background Correction (PBC Files). A PBC file can be created manually or edited by selecting “Background correction” under Editors in the LVis Menu Bar. This opens a dialogue to select an existing background correction file (*.PBC) for modification.

Note that PBC files are linked to a detector which is why they are best stored in a subdirectory named “PBC” in the LVis database directory of the respective detector. These folders are created

automatically in each detector folder by LVis and when creating a PBC file from the “Analysis results” tab of an LVis LVM file this will be your default PBC file location where the file will be stored. However when using the editor from the menu bar, you will be directed to the default library folder.

The Peak Background Correction editor itself looks like this:

**IMAGE MISSING**

The PBC editor looks very much like the nuclide library editor. It is possible to load an existing PBC file or add data from one. When loading or adding background data from an existing PBC file (*.pbc) one can reset all peak background count rates to 0 by clicking “Neutral”.

Right clicking on a peak energy or a nuclide name will bring up a context menu from where a PBC entry can either be deleted, manually added or and existing entry can be modified. The respective editor for the nuclide and peak specific correction factors are shown below

**IMAGE MISSING**

**IMAGE MISSING**

For each peak background count rate an individual uncertainty can be defined, which will be applied to the uncertainty of the respective peak activity (see Peaked Background Correction and Uncertainty Calculations).

### Geometry Correction Editor

The geometry correction is used to compensate for differences between two counting geometries. As shown in the equation in chapter Geometry Corrections (GEO Files), the respective correction factors (at energy E) are multiplied with the peak activities for each identified peak from the library (at the same energy E). The factors are stored in a table as energy correction factor pairs. The determination of the correction factors can be performed experimentally by counting the two samples and calculating the ratio of the peak activities. Hence the geometry correction editor consists of a 4 column table, where one can enter the peak energy, the reference and the actual value as well as their ratio (which is calculated automatically when entering the reference and the current value). The ratio itself represents the correction factor. The factor is linearly interpolated between the energies in the table and linearly extrapolated outside the energy range of the table points. In LVis this is shown in a graph.

**IMAGE MISSING**

Geometry tables can be built automatically in GammaVision using analysis results (.UFO) files. The correction can be greater or less than 1.0 to allow for corrections between any two geometries. In LVis GEO file can be created manually or edited by selecting “Geometry correction” under Editors in the LVis Menu Bar. This opens a dialogue to select an existing geometry correction file (*.GEO) for modification. So, one way to create a geometry correction file is to manually enter the energy, reference and actual value by double clicking into the table.

Note that GEO files are linked to a detector which is why they are best stored in a subdirectory named “GEO” in the LVis database directory of the respective detector. These folders are created automatically in each detector folder by LVis and when using GEO files in an LVM file. However when using the editor from the menu bar, you will be directed to the default library folder.

Since the geometry correction basically applies an energy dependent correction to every (identified) peak, the geometry correction can as well be used to apply correction factors determined by 3rd party programs like e.g. ANGLE, GeSpeCorr or (M)EFFTRAN for the efficiency transfer between different geometries. Some of these programs provide an ORTEC geometry correction file as a direct output for others the calculated correction factors have to be entered manually into the editor. Note that it is not necessary to provide values for the reference and the actual value. Only energy and correction factor are mandatory entries.

It is as well possible to enter an uncertainty value for the geometry correction (see Geometry Uncertainty Estimate). Note that if the uncertainty is 0 or no value is entered, or if using a .GEO file from an earlier version of GammaVision, a fixed value of 1.5 % is used.

### Materials Editor

Some functions in LVis, eg the efficiency transfer calculation by EFFTRAN, require the declaration of materials like eg the sample material or the compounds that the detector element is consisting of. In LVis it is possible to create new materials with the Materials Editor that can be accessed from the Main menu “Editors”.

**IMAGE MISSING**

Every material in LVis is composed of (multiple) chemical elements and/or molecules. Every material is characterized by its name and density. To create a new element, open the materials editor and click “New”, then specify a name. To modify an existing material, select one from the list and click “Edit”. This will bring you to the following dialogue:

**IMAGE MISSING**

To add a molecule or element from the library on the left side to the material composition on the right side, simply drag and drop the molecule/element from the left to the right. When all ingredients of your material are listed specify the mass fraction (mass percentage) for each. In case you want to create a new molecule (all elements are already available) simply click on “New” below the library

listing the existing molecule/elements. This will bring up the following window:


To create a new molecule simply drag and drop the elemental constituents from the left library to the right, then define the atomic fraction and the name.

### External Database Editor

With the “External Database” feature of LVis it is possible to link a complete set of data to a measurement and show this data on a separate tab in an LVM file. The selection of the data set is achieved by listing a key value in the “Location field” of a parameter set. Such a dataset is usually implemented by importing it from a LIMS or any other database by csv file import/export. However, prior to any import or linking it is necessary to configure the database fields that should be displayed on the LVis LVM file. This configuration can be defined with the “External Database Editor”, so the very first time, when the external database editor is started the following configuration window will pop up.


The first thing to do, is to define the name of the data set (give it a label). Note that this label will later be displayed as the name of the tab in the LVM file. In addition, it is possible to define the separator in the CSV file that will be used to import data into the database.

Clicking on “Add” will allow the definition of a new data field in the database. It is possible to select from six different types of data (see screenshot above). For each data field, one has to specify a name (label), a preset (default value), the position of the value in the csv file, the position of the respective field on the tab in LVis as well as the limits for the size of a value and if the entry is unique.


The “Position in LVis” is referring to the location of the respective data entry on the database tab in an LVM file. The following dataset of patient information (see screenshot below):


will show the database entries on the tab like this:

**IMAGE MISSING**

Note that the pulldown menu for the Location field of the parameter set will be different depending on which of the database fields were ticked for “Selection” in this configuration. The three entries selection shown above will bring up a selection menu like this:

**IMAGE MISSING**

Once the database fields are defined and configured, the “External Database Editor” will come up with the default editor that allows to add new entries to the database

**IMAGE MISSING**

Clicking on “Add” will bring up the following window, that allows manual entry of a new data set.

**IMAGE MISSING**

Note that “Import of datasets via a csv file” (see blue marking below) as well as editing the “Database Settings” (see red marking) can be achieved by clicking on the icon in the top left corner of the database editor

**IMAGE MISSING**

## Admin

### Login and Logoff

### Change Password

### Set Start Password

### LabJournal

### Help

# Configuration bar

## Detectors

#### Detector Context Menus

#### Adding Detectors

#### Removing Detectors

#### Reconnecting Detectors (eg after replacement of hardware)

#### Detector Configuration

#### Detector Calibration

## Parameter Sets

#### Create and Delete Parameter Sets

#### Edit Parameter Set

#### Copy Parameter Set - Insert Parameter Set

#### Save Parameter Set — Load Parameter Set

#### Import Parameter Set from existing .LVM-file

## Reference Sources

#### Creation of a New Reference Source

#### Save and Load Reference Sources

#### Edit Reference Source

### Buffer

#### Spectrum Summing – Spectrum Subtraction

### Multi-Detector Configurations

#### Creation of a Multi-Detector Configuration

#### Starting a Multi-Detector Configuration

#### Edit or Delete a Multi-Detector Configuration

### Save and Restore the LVis Configuration

#### Restoring a Configuration

### Currently Open

## Desktop

### Spectrum Window – Live Detector Display

### Measurement Presentation