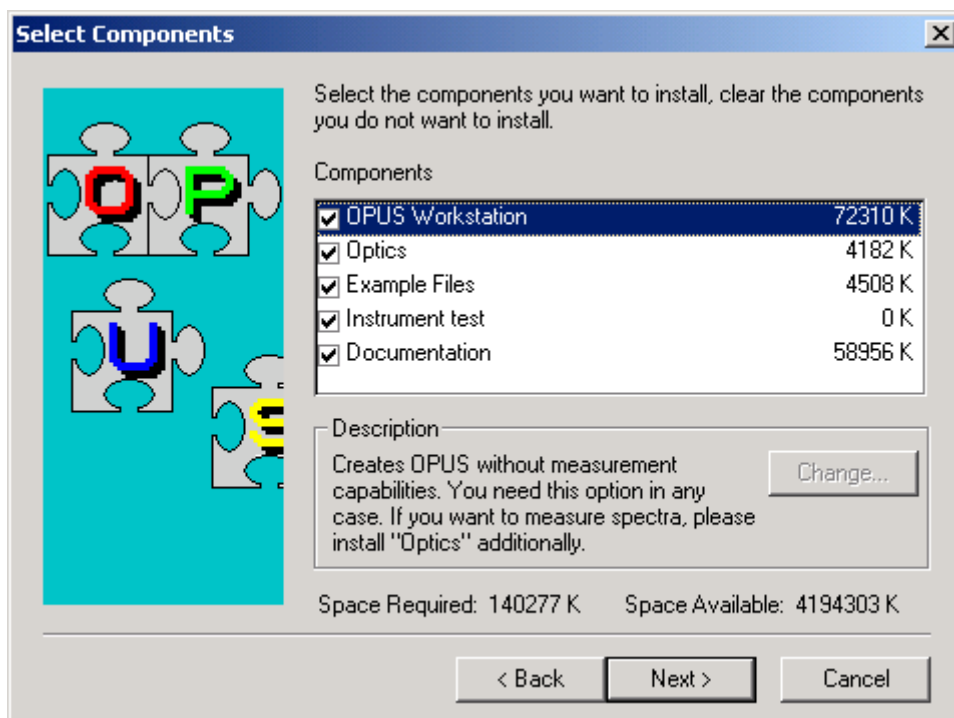


# OPUS 4.2 Instrument Test

## Notes on some items

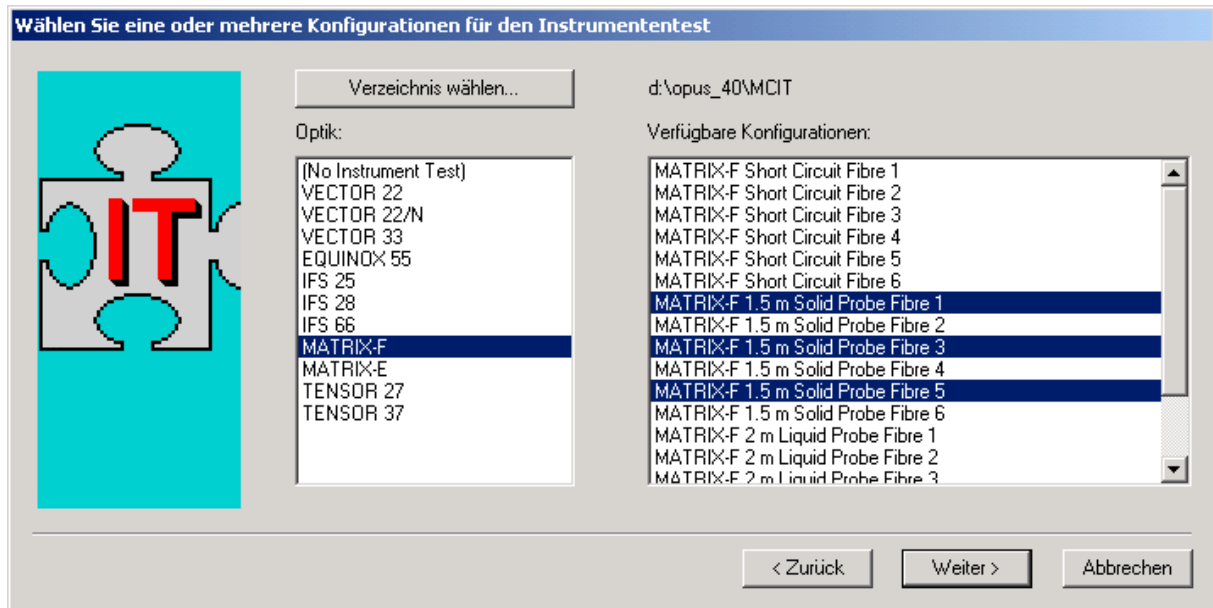
### 1. Installation

The Instrument Test is installed during the OPUS-installation. On the page *Select Components* the item *Instrument test* must be checked (default setting).



On the page *Choose one or several configurations for the Instrument Test* first select the Instrument Type in the list *Optic* (e.g. MATRIX-F or TENSOR 27). (The Instrument Test is *not* installed if you select (*No Instrument Test*)). On the right side the available Instrument Test configurations are listed. Click with the mouse on each configuration which you want to install.

The main directory for the Instrument Test is <OPUS Path>\MCIT by default. You can choose another main directory by clicking on the button *Select directory...* . It's not necessary that the files belonging to the Instrument Test are installed in subdirectories of OPUS.

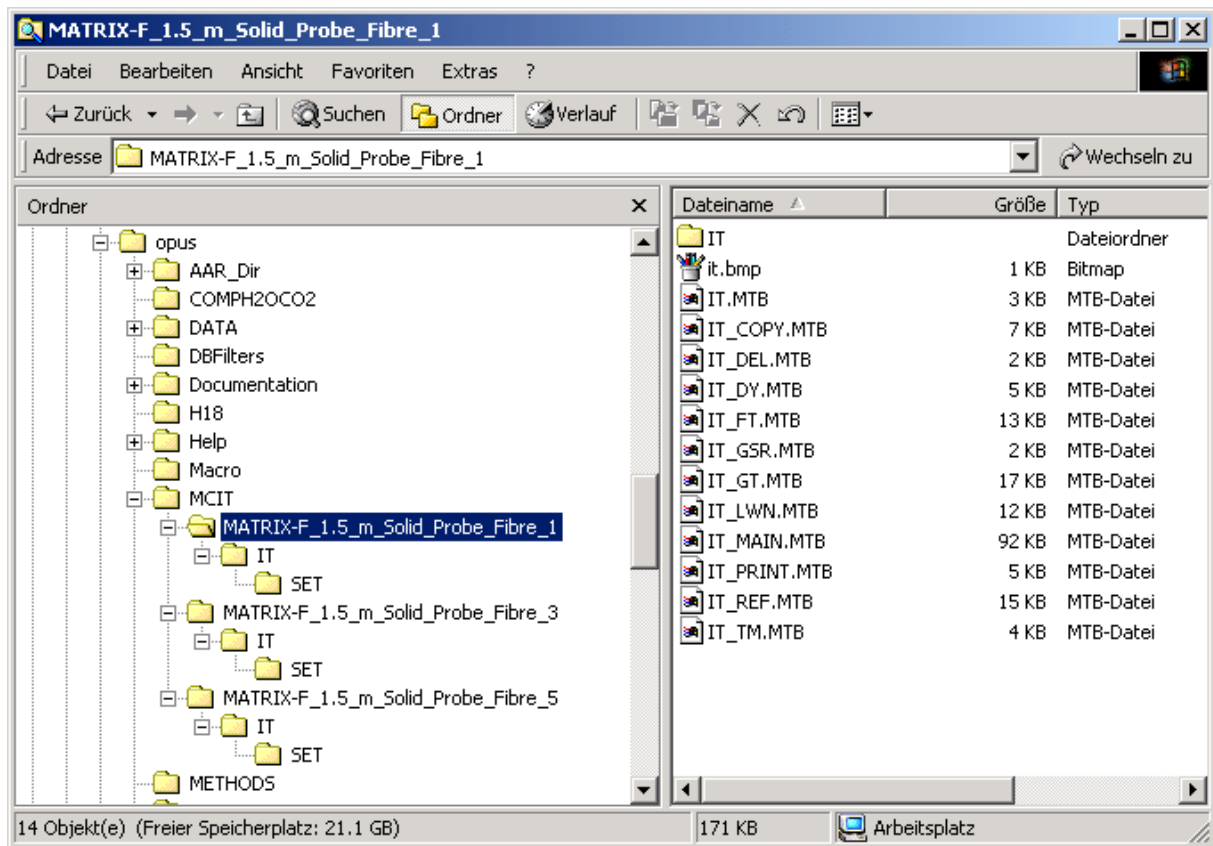


## 2. Directories

For each selected configuration a subdirectory below the main directory is created which contains the Instrument Test macro files for this configuration (e.g. *d:\opus\MCIT\MATRIX-F\_1.5\_m\_Solid\_Probe\_Fibre\_1\*). The macros are now in binary format (extension *mtb*) and cannot be edited. The main macro for starting the Instrument Test for a certain configuration is *IT.mtb*.

Below the directory which contains the macros is the directory *IT*. All reference and test spectra and all test reports for a certain configuration will be stored here. Below the directory

IT the directory *SET* is created. It contains all measurement experiments, integration methods and the configuration file *IT\_SET.0*.



## Use of old Reference Spectra

In the Setup of the Instrument Test up to three reference spectra (ENERGY.0, GFA.0 and GFB.0) are measured. If the user worked with OPUS-NT 3.1 and wants to use the reference spectra of this version also in OPUS 4.2, he can copy the reference spectra from the 'old' (3.1) to the 'new' (4.2) directory:

Example: Copy the reference spectra from

`\OPUS_NT\IT`

to

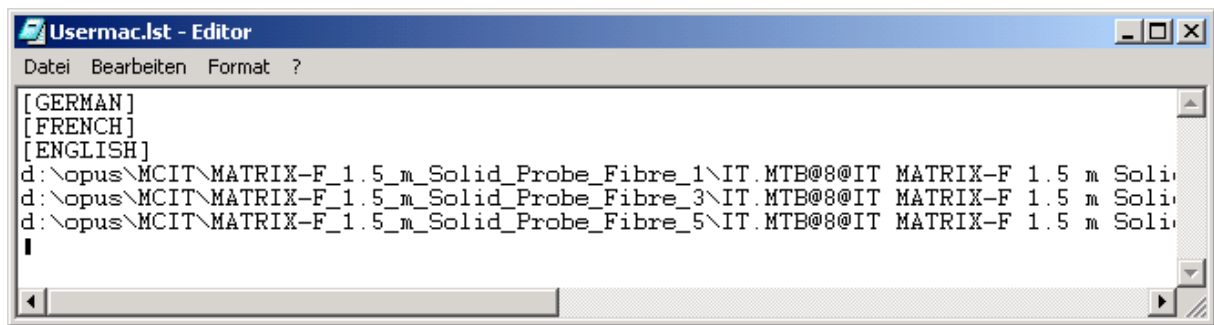
`\OPUS\MCIT\MATRIX-F_1.5m_Solid_Probe_Fibre_1\IT.`

Be sure that you work with the same Laser Wavenumber as in OPUS-NT 3.1. The standard Laser Wavenumber given on the page *Interferometer / AQP* of the function *Optic Setup and Service* (menu *Measure*) in the OPUS 4.2 version should be identical to the Laser Wavenumber which was used to measure the reference spectra. Load a reference spectrum in OPUS, perform a right-click and choose *Show Parameters*. You find this Laser Wavenumber in the block *Instrument parameters*.

Do not use the function *Adjust Laser Wavenumber* in the OPUS 4.2 Instrument Test, since after a change of the Laser Wavenumber (even if this change is small) new reference spectra must be measured.

### 3. Usermac.lst

The file *Usermac.lst* is stored in the OPUS-Path. It contains an entry for each Instrument configuration to show an menu item in the OPUS *Validation* menu. *Usermac.lst* is now language dependent. If you perform an OPUS installation in German and start the OPUS in English, there will be no Instrument Test entry in the *Validation* menu !



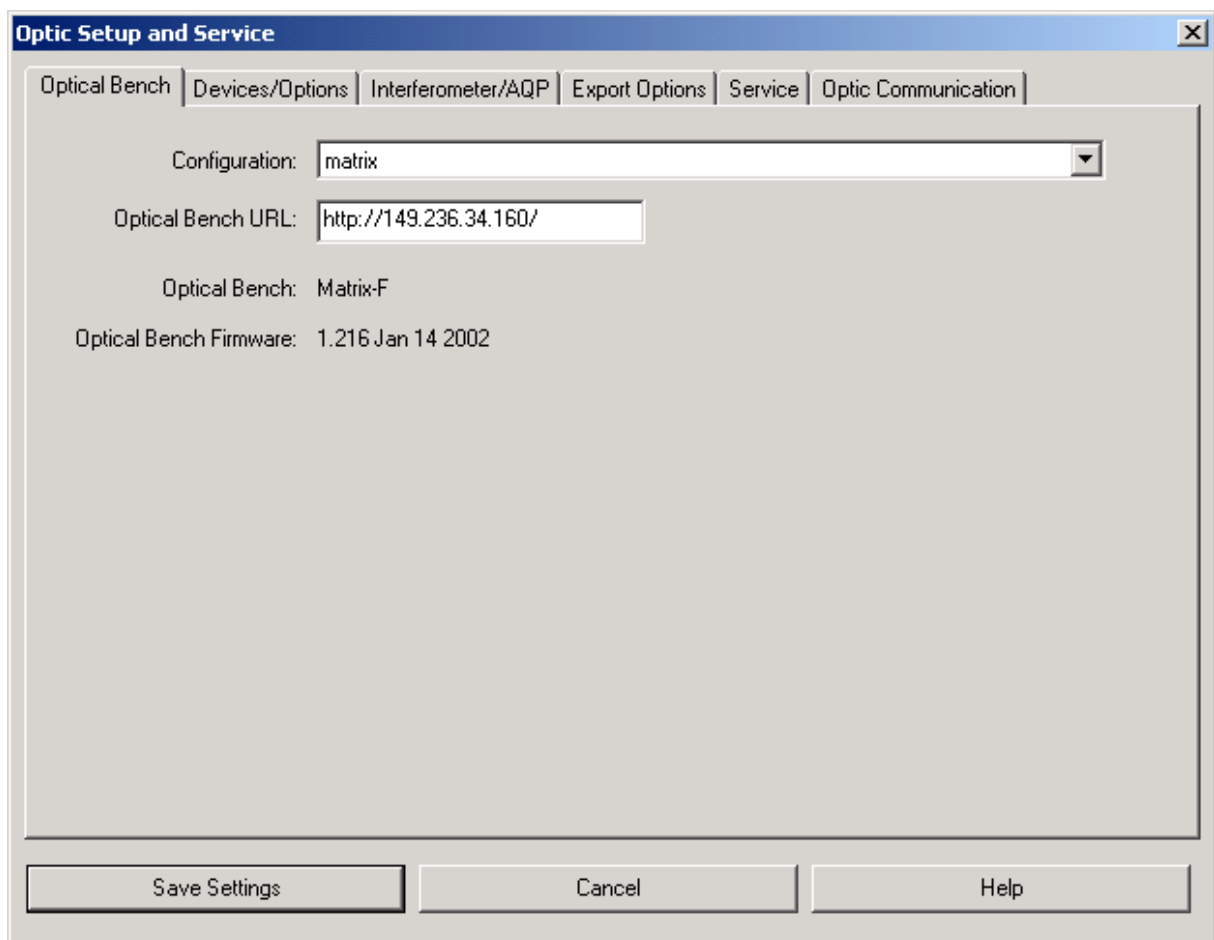
```
Usermac.lst - Editor
Datei Bearbeiten Format ?
[GERMAN]
[FRENCH]
[ENGLISH]
d:\opus\MCIT\MATRIX-F_1.5_m_Solid_Probe_Fibre_1\IT.MTB@8@IT MATRIX-F 1.5 m Solid
d:\opus\MCIT\MATRIX-F_1.5_m_Solid_Probe_Fibre_3\IT.MTB@8@IT MATRIX-F 1.5 m Solid
d:\opus\MCIT\MATRIX-F_1.5_m_Solid_Probe_Fibre_5\IT.MTB@8@IT MATRIX-F 1.5 m Solid
|
```

## 4. Firmware Update

For the new Bruker Optik Instrument Types (MATRIX, TENSOR...) the OPUS 4.2 Instrument Test works correctly only if an up-to-date firmware is used.

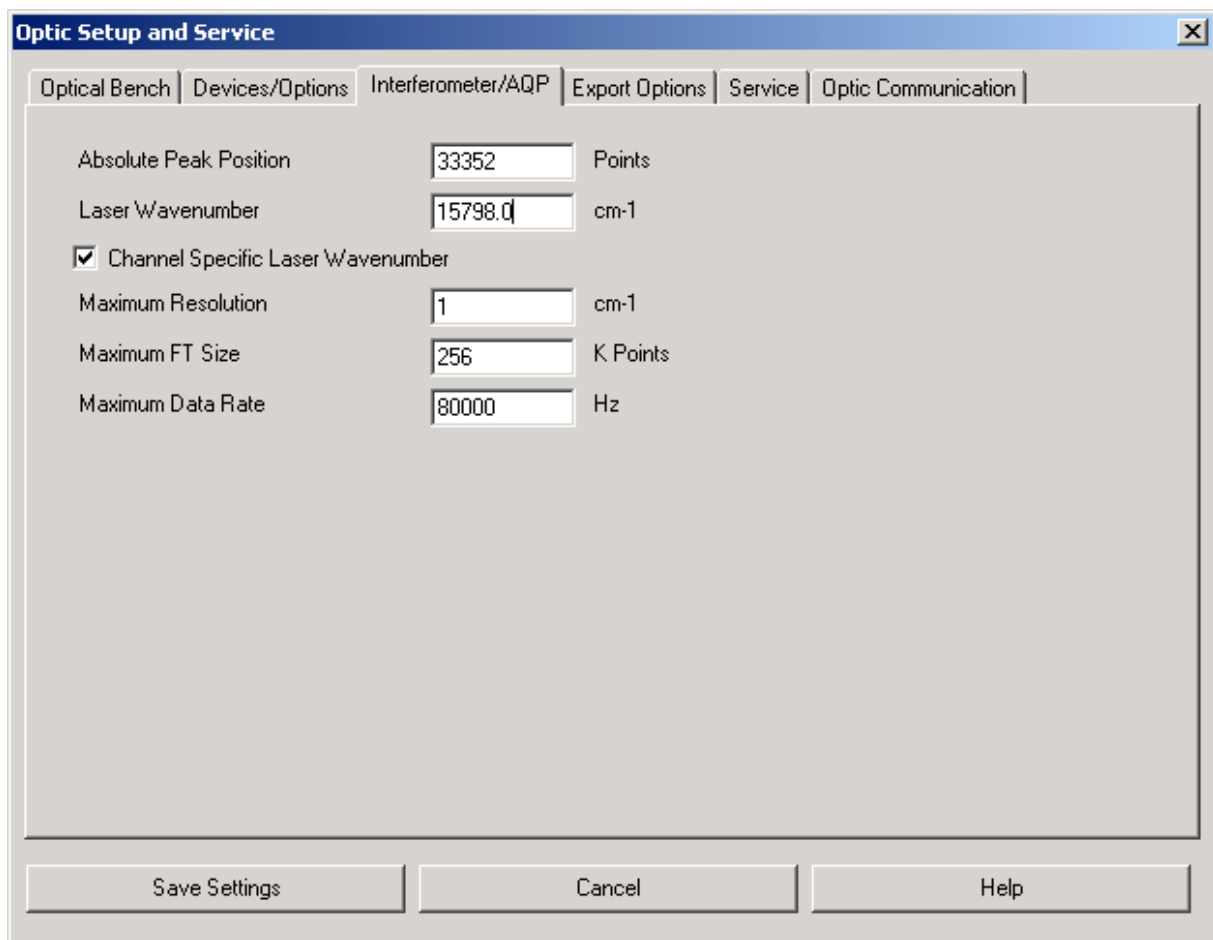
You can check the release date of the Instrument firmware with the function *Optic Setup and Service* (menu *Measure*). On the page *Optical Bench* the date is given in the line *Optical Bench Firmware*. The firmware must be created in January 2002 (or later). The version number has to be 1.216 or higher.

It's strongly recommended to perform a firmware update if the firmware of your optical bench is older.



## 5. Optic Setup and Service

Before starting an Instrument Test, several things have to be done in OPUS. Start the function *Optic Setup and Service* in the *Measure* menu. Go to the page *Interferometer / AQP*. The standard Laser Wavenumber is normally  $15798.0 \text{ cm}^{-1}$ . Check the item *Channel specific Laser Wavenumber*. Even if you use only one measurement channel (e.g. *Sample Compartment*), this option must be activated. Exit the function *Optic Setup and Service* with the button *Save Settings*.

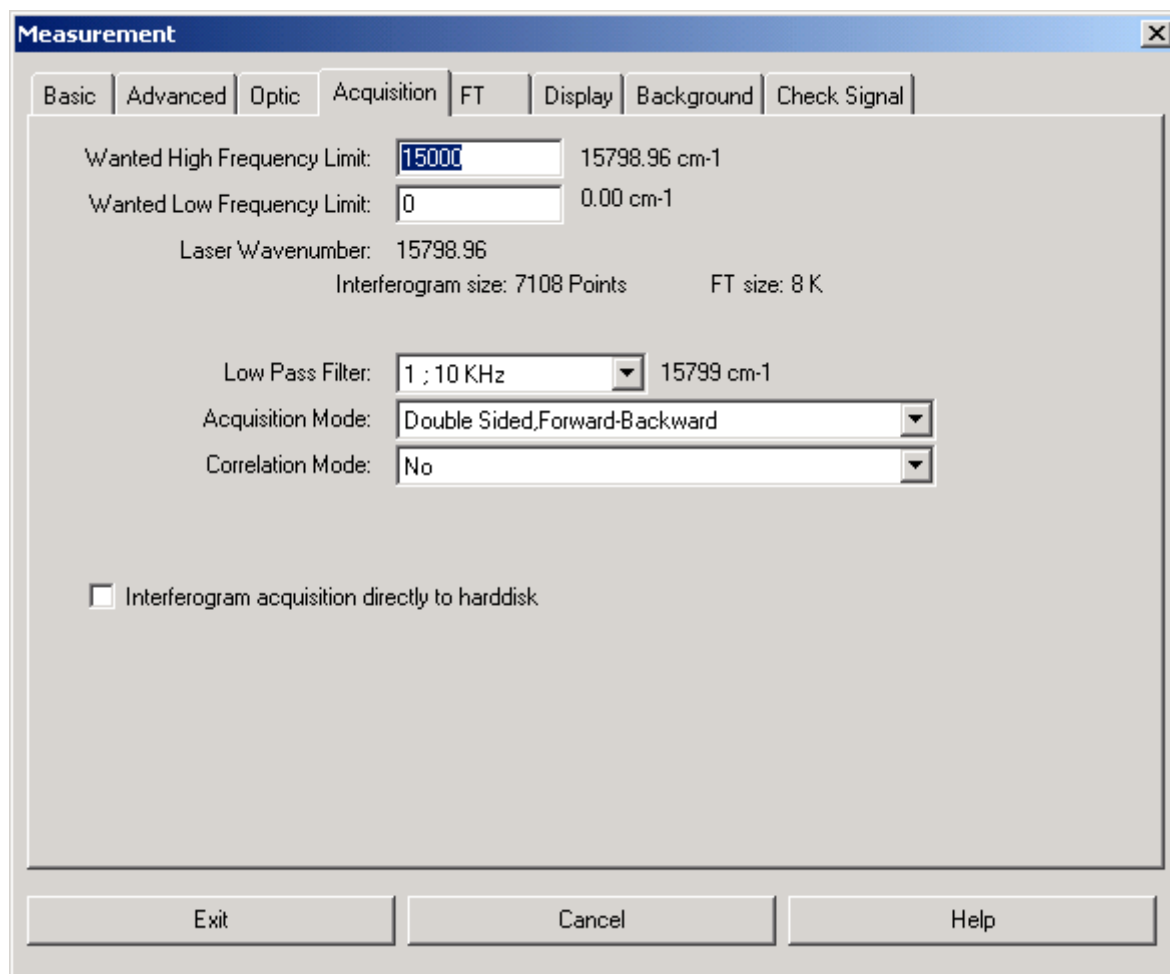


## 6. Channel Specific Laser Wavenumbers

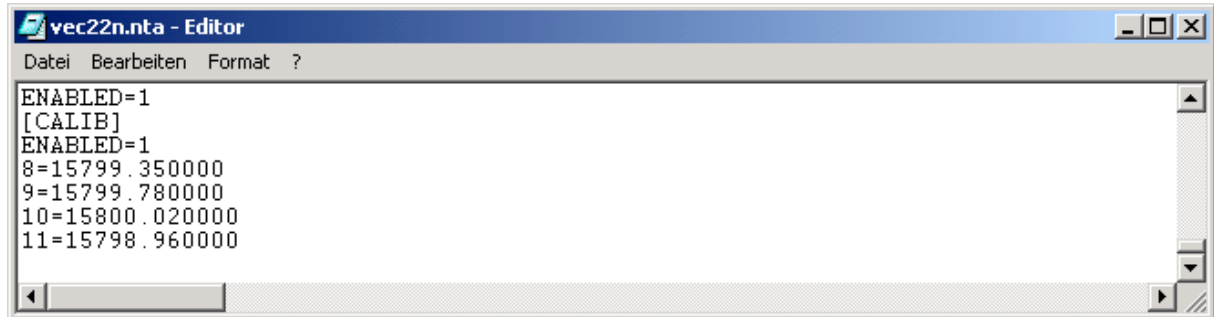
OPUS 4.2 offers the possibility to use for each measurement channel (defined by the CHN parameter) its own Laser Wavenumber. If for a certain measurement channel no specific Laser Wavenumber is defined, the standard Laser Wavenumber given on the page *Interferometer / AQP* is used.

The channel specific Laser Wavenumber is set in the Instrument Test with the function *Adjust Laser Wavenumber* (see chapter 12).

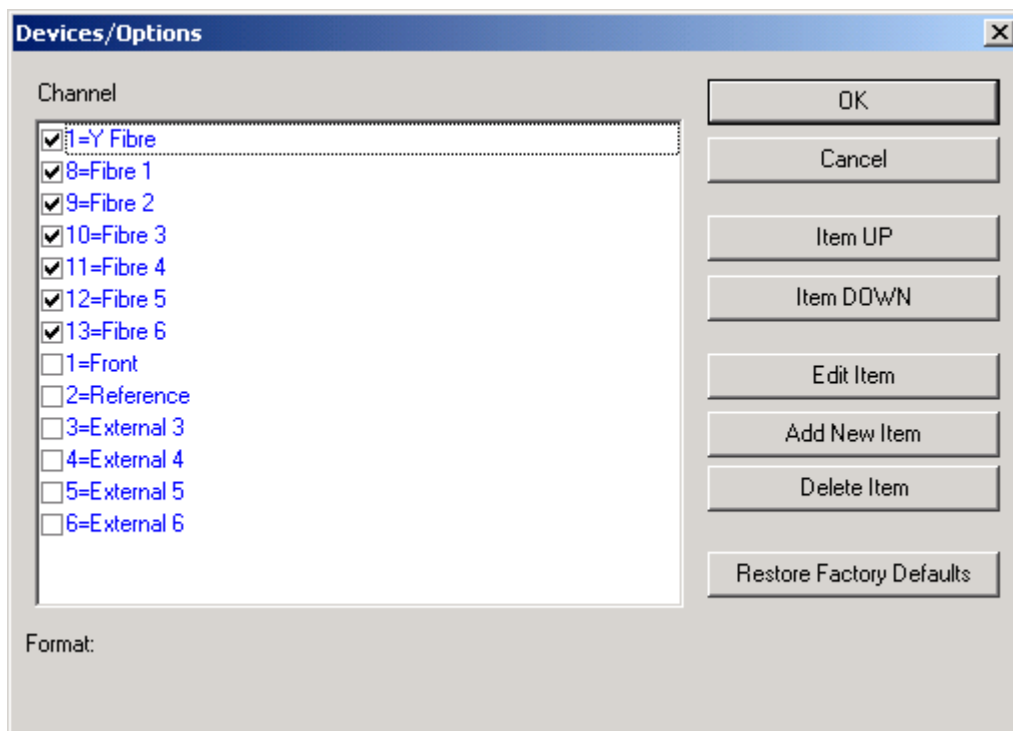
The Laser Wavenumber which is currently used for a certain channel is given on the page *Acquisition of the Measurement* function.



For instruments which measure with the AQP, the channel specific Laser Wavenumbers are stored in the *nta*-file (e.g. Vec22n.nta) which can be found in the OPUS directory. You find the Laser Wavenumbers under the label *[CALIB]*.

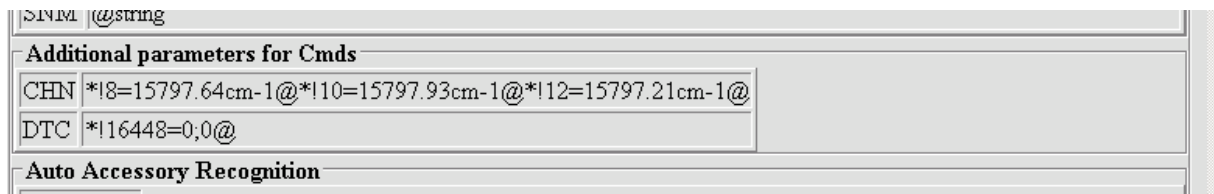


The integer number specifies the measurement channel. The corresponding channel name is given in *Optic Setup and Service*, page *Decives / Options*, if you click on the button *Setup* in the line *Channel*.

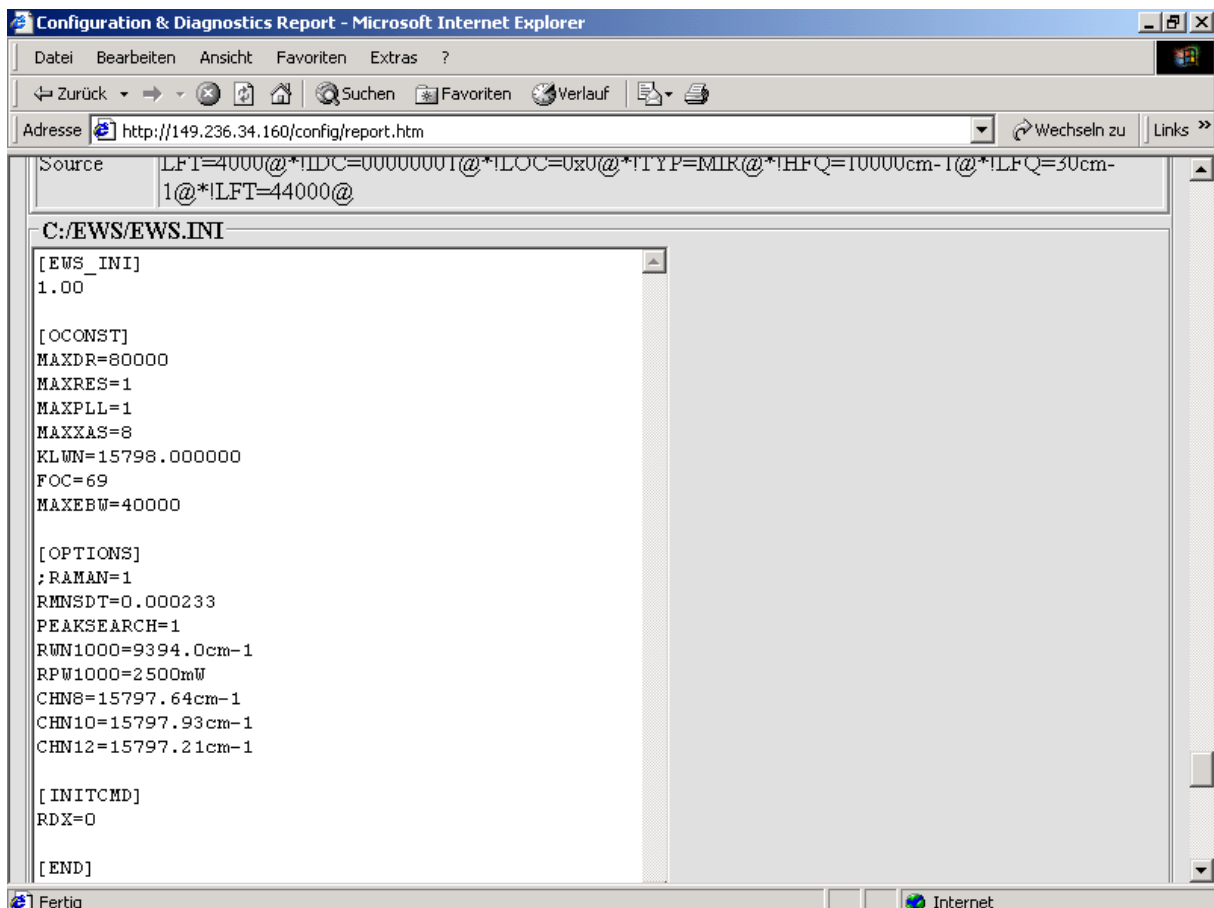




For the new instrument types the channel specific Laser Wavenumbers can be viewed with the Internet Explorer. Starting from the instrument home page go to *Service -> Full Report*. Then scroll down to the field *Additional parameters for Cmds*. You will find the Laser Wavenumbers in the line *CHN*.

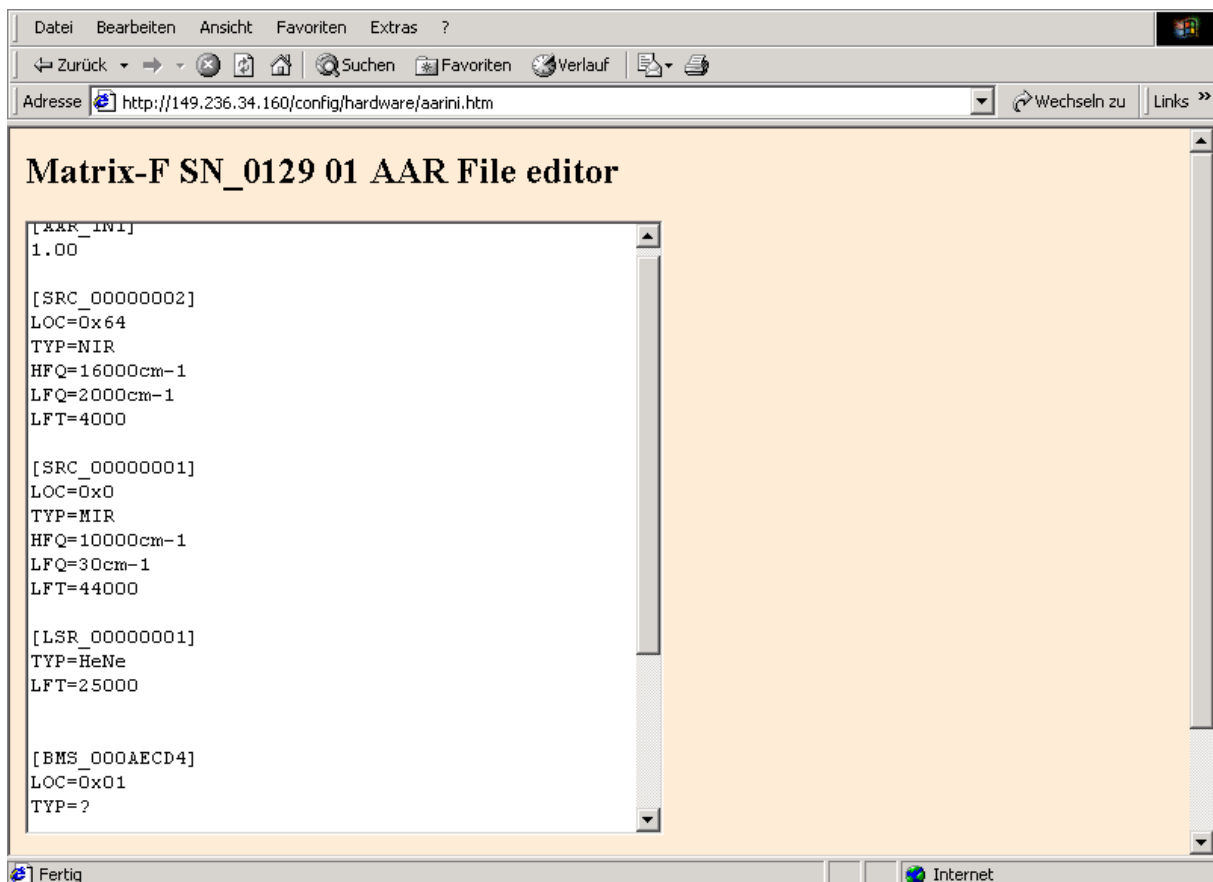


The numbers are also given in the EWS.ini, which is shown on the same page.



## 7. Beamsplitter

For the new instrument types (MATRIX, TENSOR...) a valid beamsplitter name should existing in the firmware. Normally this is managed by a VB-Script which is started from OPUS. If your current OPUS version is not equipped with the feature, the beamsplitter type can be manually set with the Internet Explorer. Starting from the instrument home page go to *Service -> Edit hardware configuration -> Edit AAR.ini for Auto Accessory Recognition*. If there is a ? given for the beamsplitter type, you should enter a valid name.



Beamsplitter Typ	HFQ	LFQ
Quartz	15500	3300
CaF2	15000	1200
KBr	7500	370
KBr-Broadband	10000	400
CsI	5000	200
ZnSe	6000	500

Enter the beamsplitter name in the line *Typ* and the *HFQ* and *LFQ* limits according to the table above.

```
[BMS_000&ECD4]
LOC=0x01
TYP=Quartz
HFQ=15500cm-1
LFQ=3300cm-1
```

Save AAR.INI    Back

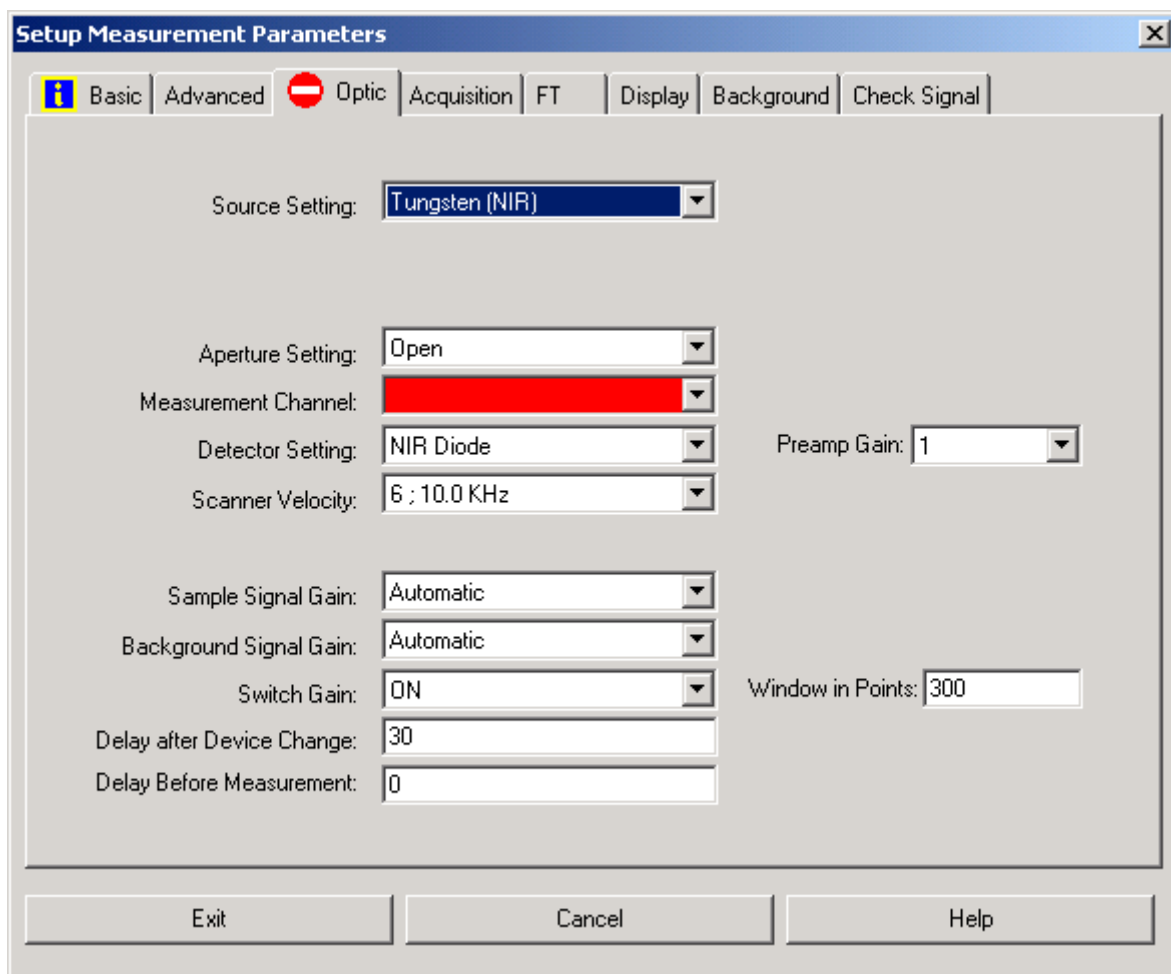
Click on the button *Save AAR.ini* and then on *Back*. On the hardware page click on the item *<<One Level Back*. On the Config page click on *Reset Instrument*. The Reset page is shown.



Click on the button *RESET INSTRUMENT*. The operation may take a while. Wait until the instrument beeps.

## 8. Check Experiments

All *XPM*-files used in the Instrument Test should be checked. They are stored in the various *IT\SET* subdirectories and have the names *IT.xpm*, *IT\_FR.xpm*, *IT\_GF.xpm* and *IT\_PS.xpm* (the last one is sometimes missing). Go to the *Measure* menu and start the function *Setup Measurement Parameters*. Load the first IT-experiment. If there is no red error sign, everything is OK. ( A blue-yellow information sign is allowed). Check all IT-experiments. If a red error sign comes up, correct the setting. Then go to the page *Advanced* and store the method. If you work in validated environment (21 CFR 11), the experiments must signed now with category *Release* (see chapter 15).



### Use of old experiments

If an user worked with OPUS-NT 3.1 and did not use the standard IT-experiments, but adapted them for his specific needs, maybe wants to use these files also in OPUS 4.2. He must then copy the files from the 'old' (3.1) to the 'new' (4.2) directory.

Example: Copy the IT-experiments from

\OPUS-NT\IT\SET

to

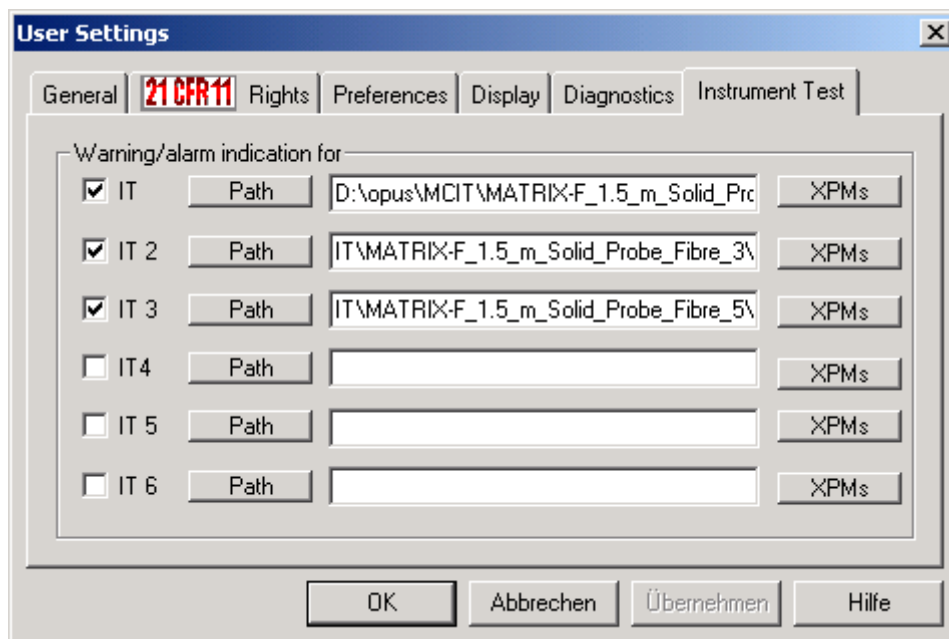
\OPUS\MCIT\EQUINOX\_55\_DTGS\IT\SET.

(The name depends on your selected configuration).

Also OPUS-NT 3.1 MATRIX-F users, who do *not* update their firmware (see chapter 4), can use the old OPUS-NT 3.1 IT-experiment files for OPUS 4.2, since they better fit to the old firmware.

## 9. User Settings – Instrument Test

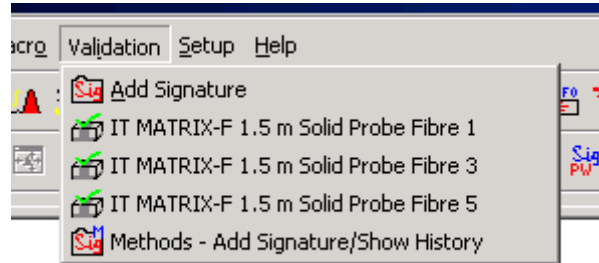
Go to the OPUS menu *Setup* and start the function *User Settings*. On the page *Instrument Test* the various Instrument Test configurations must be now registered. Up to six configurations can here be declared. Click on the button *Path* in the line *IT* and select the path where the binary macros of the first Instrument Test configuration are stored (e.g. `D:\opus\MCIT\MATRIX-F_1.5_m_Solid_Probe_Fibre_1\` ). Then specify the pathes of the other configurations, if you have any.



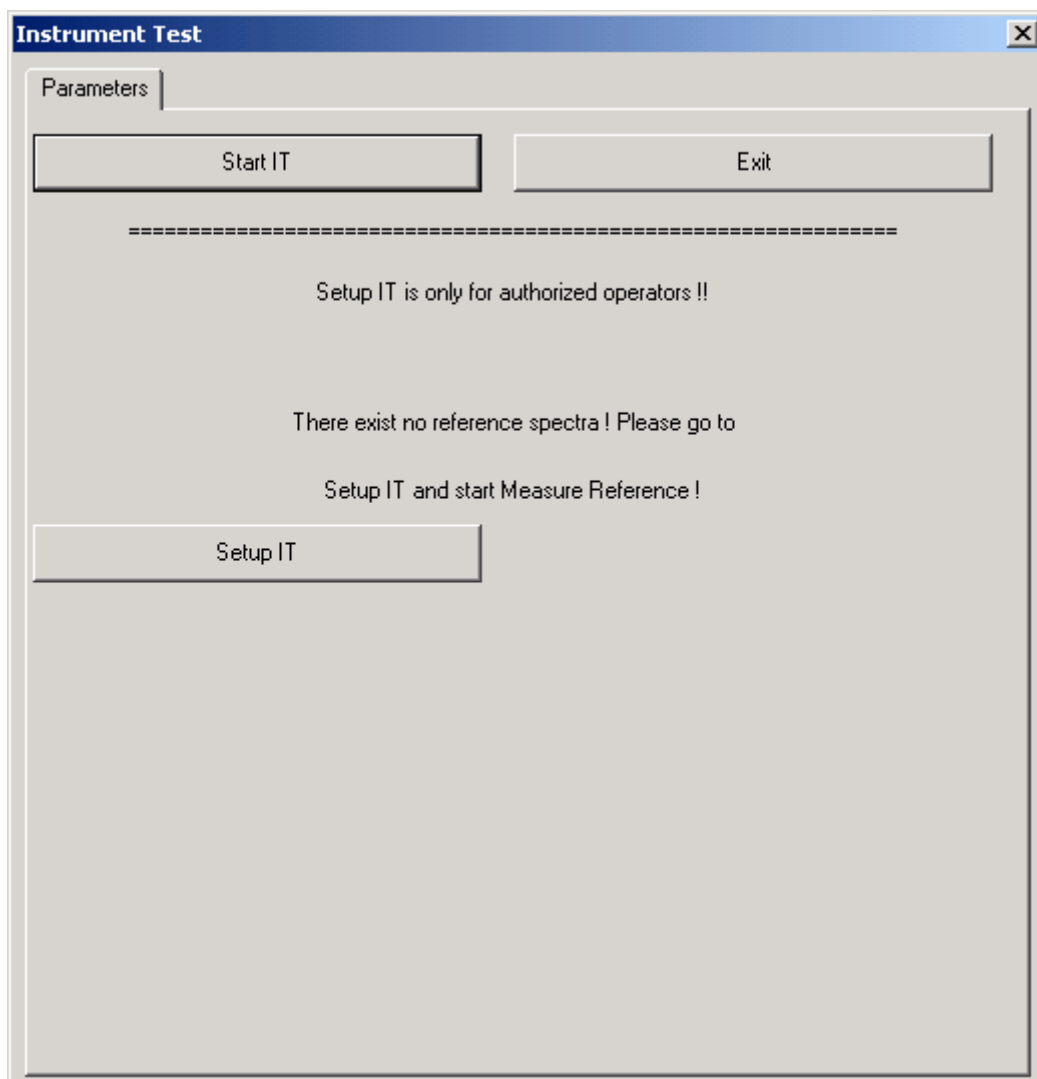
Leave the dialog box by clicking on OK.

## 9. Validation Menu

Go to the OPUS menu *Validation*. Here you will find the Instrument Test configurations which you have installed. By clicking on a menu item you can start one Instrument Test.



## 10. Setup IT



The function *Setup IT* is available only for OPUS users which have *Administrator* rights. For normal OPUS *Operators* the access is stopped. The user rights are set in the function *User Management* which you can find in the menu *Setup*. In the line *User Group* the rights for a certain User ID are defined.

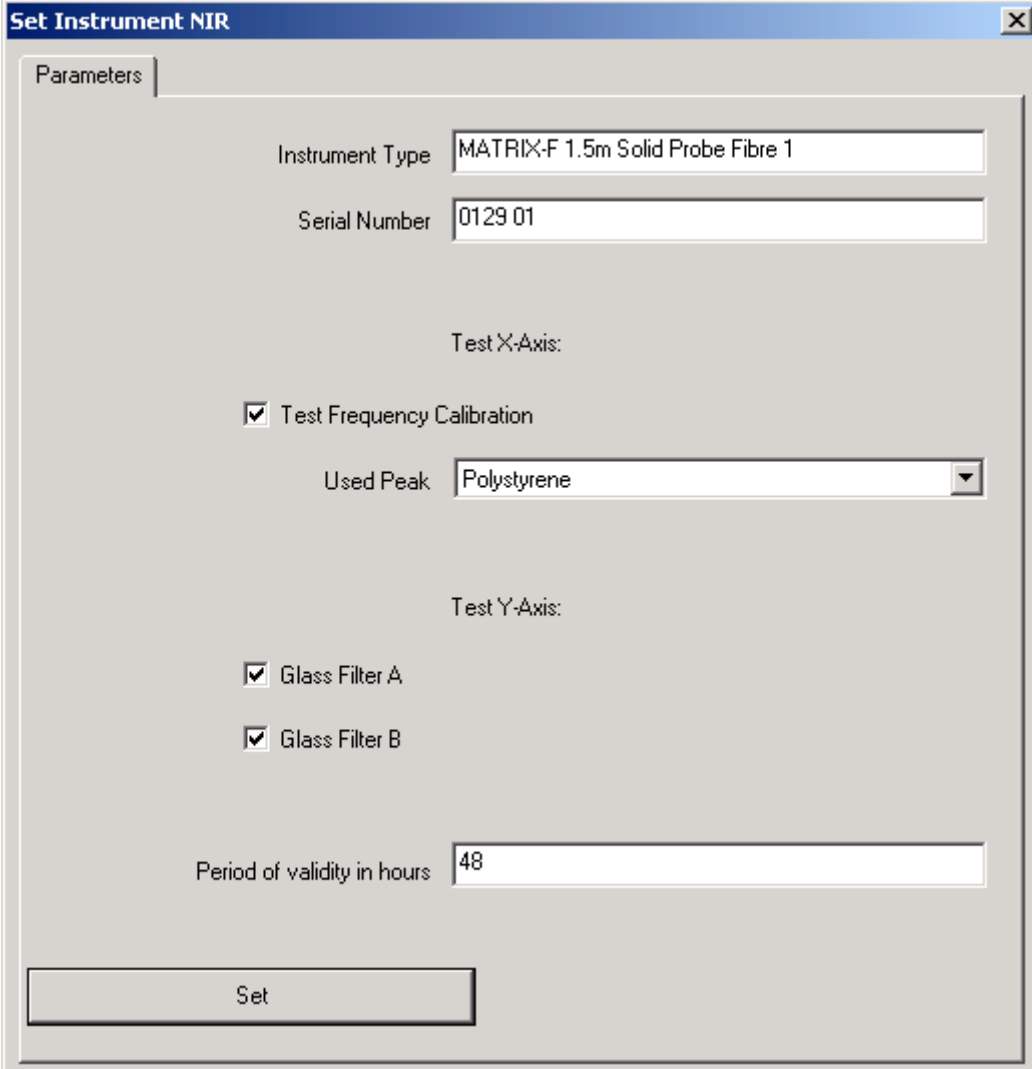
The screenshot shows a 'User Management' dialog box with the following fields and controls:

- Tabbed interface: 'Setup Record' (selected), 'Global Options', 'Audit Trail'.
- Record indicator: '1 User Records' with navigation buttons '<<' and '>>' and a central '1'.
- User ID: 'anna'
- Password: '\*\*\*\*\*'
- Password Verification: '\*\*\*\*\*'
- Password expires: 'Never'
- Operator Name: 'Bruker'
- User Group: 'Administrator' (selected in a dropdown menu). A list below shows 'Administrator' and 'Operator'.
- Lock User:  Lock User
- Delete Record: [Delete Record]
- Bottom buttons: [Store], [Cancel], [Help]



## 11. Period of validity

The period of validity for an Instrument Test is 24 hours by default. You can change this value in *Set Instrument*.



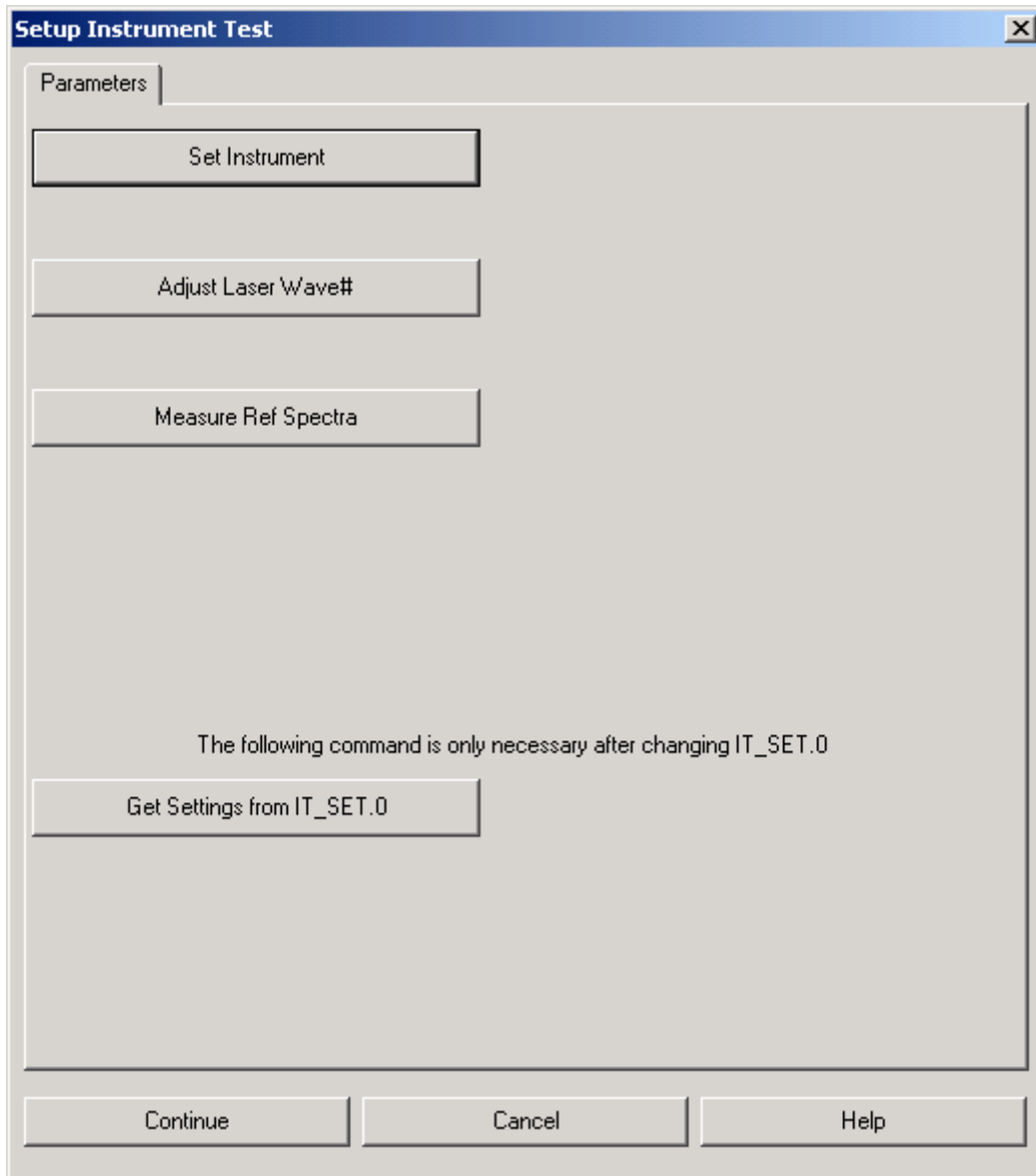
The image shows a software dialog box titled "Set Instrument NIR". It contains several input fields and checkboxes for configuring an instrument. The "Parameters" tab is selected. The fields are as follows:

- Instrument Type: MATRIX-F 1.5m Solid Probe Fibre 1
- Serial Number: 0129 01
- Test X-Axis: (empty)
- Test Frequency Calibration
- Used Peak: Polystyrene (dropdown menu)
- Test Y-Axis: (empty)
- Glass Filter A
- Glass Filter B
- Period of validity in hours: 48

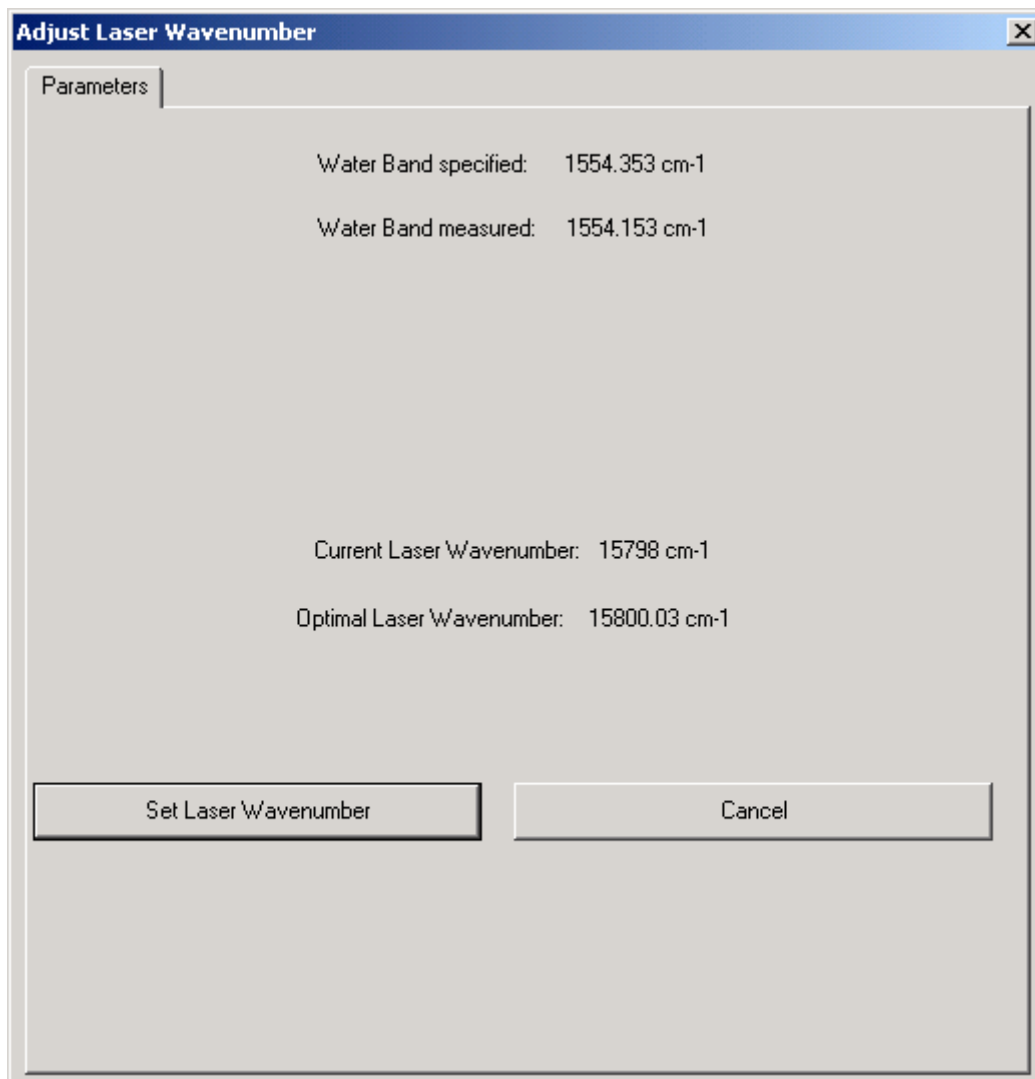
A "Set" button is located at the bottom of the dialog box.

## 12. Adjust Laser Wavenumber

On the page *Setup Instrument Test* is the new function *Adjust Laser Wavenumber*. With this function the water vapour spectrum is measured and the channel specific Laser Wavenumber is calculated.



Click on *Adjust Laser Wave#* to start the measurement. The next page shows the results.

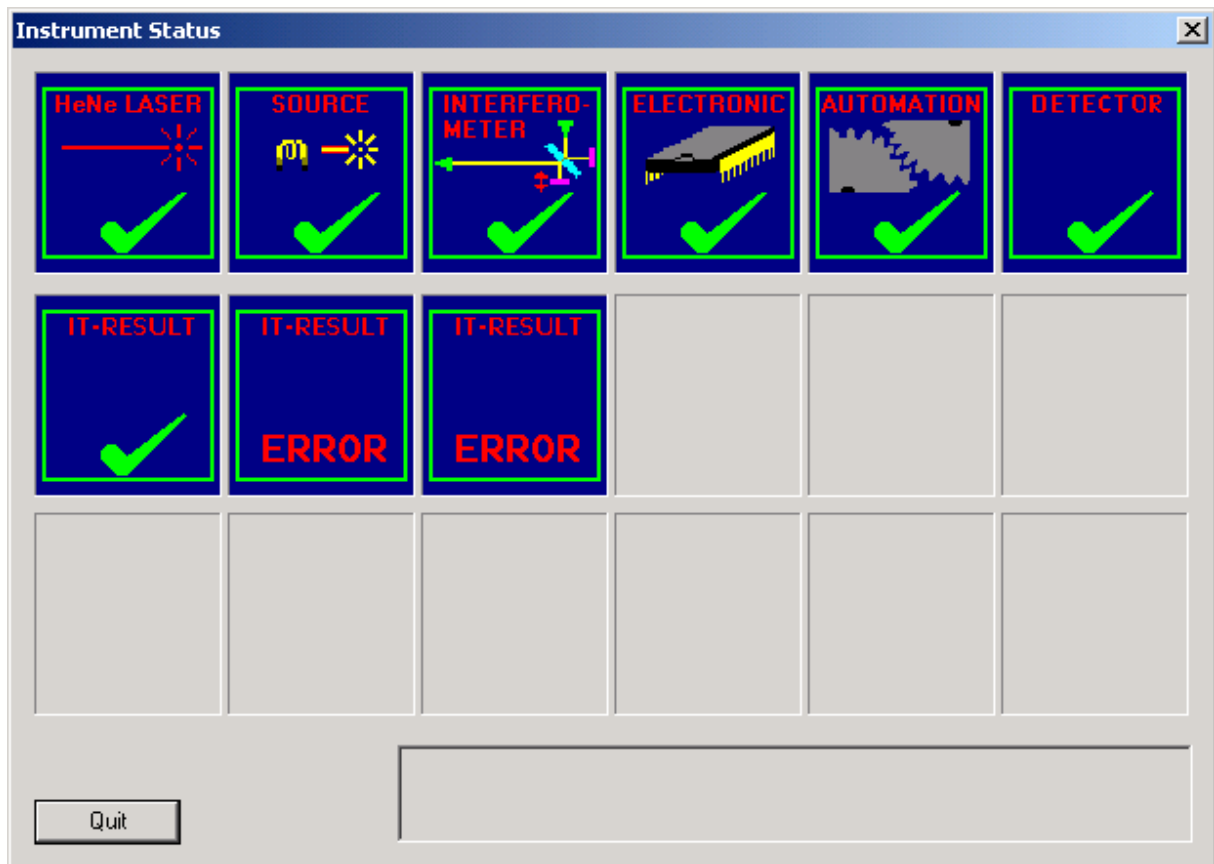


When you are setting up your system for the first time the standard Laser Wavenumber is taken for the measurement (->*Optic Setup and Service* -> *Interferometer / AQP* -> edit field *Laser Wavenumber*). Normally this should be 15798.0 cm-1. In the Instrument Test this value is given in the line *Current Laser Wavenumber*. The calculated channel specific Laser Wavenumber is given in the line *Optimal Laser Wavenumber*. If you click on the button *Set Laser Wavenumber* this value is set for the used measurement channel (in the firmware for MATRIX, TENSOR... instruments or in the *nta*-file for the other instruments, see chapter 6). It's not necessary to set this value manually.

As long as the option *Channel Specific Laser Wavenumber* is activated in *Optic Setup and Service*, all experiments which use this measurement channel will take this specific Laser Wavenumber.

### 13. Instrument Status

If you click on the small Instrument Status light in the right bottom corner of OPUS (or if you call the function *Optics Diagnostics* in the *Measure* menu) you get the Instrument Status. Here the status of several hardware components and the status of the Instrument Test configurations are listed.

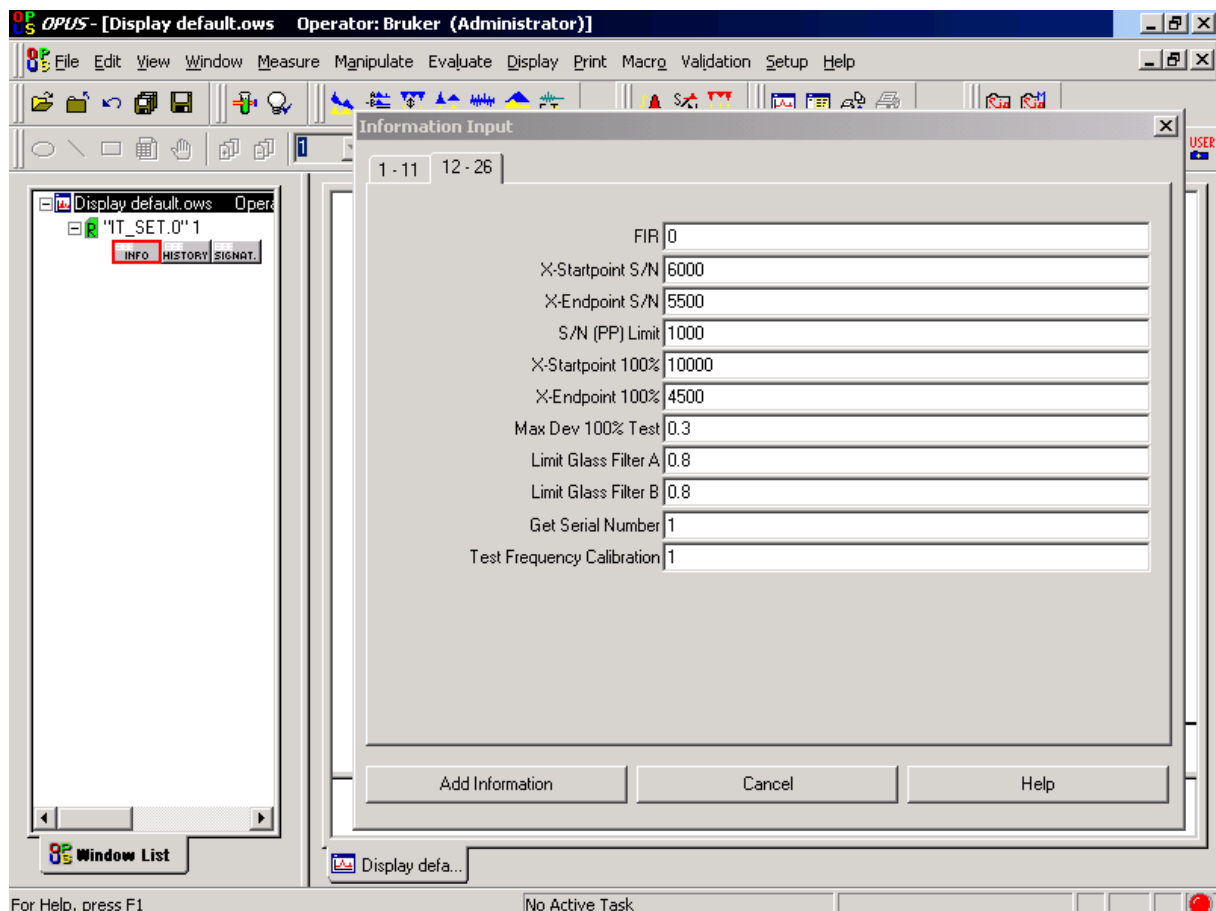


## 14. Configuration Changes

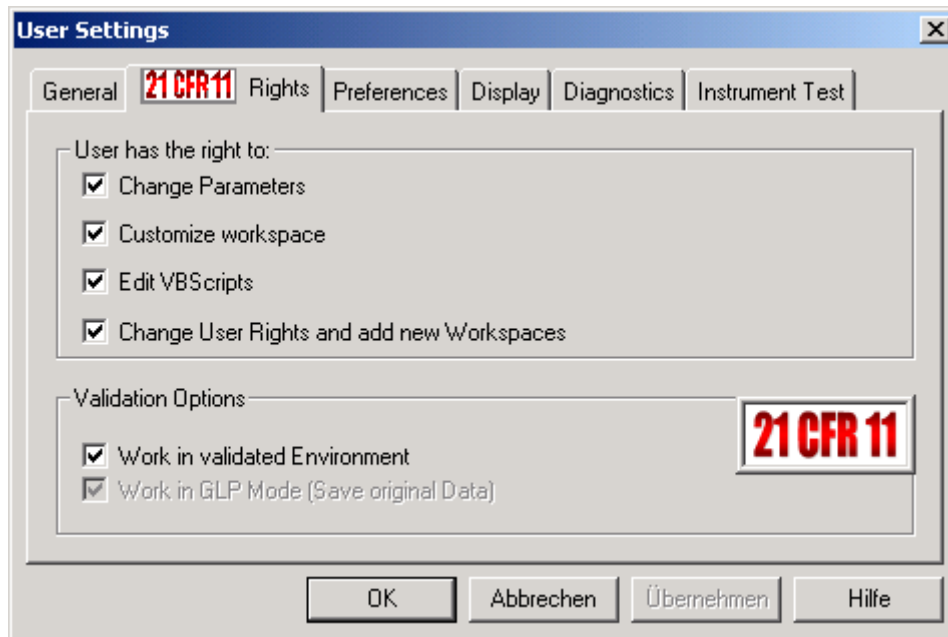
Sometimes it is necessary to change some settings of an Instrument Test configuration. Example: the operator uses an 80 meter fibre instead of the standard 1.5 m fibre. In this case e.g. the frequency limits for the 100 % Line test must be changed. This can be done in the following way:

Load the file IT\_SET.0 into OPUS. This configuration file is stored in the directory \IT\SET. Call the function *Information Input* in the *Edit* menu. Go to the second page and change the parameter *X-Endpoint 100 %* from 4500 to 5000. Click on the button *Add Information*. The file gets now the red card, which means, that the file was changed, but this change is in the moment not yet stored on the haddisk. Call the function *Save File* in the *File* menu and save IT\_SET.0. The file will get the blue card. Then unload this file from OPUS.

Start the corresponding Instrument Test and go to the page *Setup Instrument Test* (see page 15). If you click on the button *Get Settings from IT\_SET.0* the new information is read from the file IT\_SET.0 to the Instrument Test macro.



## 15. Instrument Test in validated Environment



If the user works in validated environment (21 CFR 11, menu *Setup->User Settings->Rights*), all method files (e.g. measurement experiments, integration methods etc.) must be signed with the category *Release*. All Instrument Test method files which are installed from the OPUS 4.2 installation CD have this *Release* signature. The \*.xpm and \*.int method files are stored in the corresponding \IT\SET subdirectory.

The signature data block for method files can be viewed and created with the function *Methods – Add Signature / Show History* which can be found in the *Validation* menu. Start this function, select the wanted method type (e.g. *Measurement Experiments*), click on *Load Method* and select the file. On the page *Signature* you see the content of the signature data block. A signature is only valid, if it was the last operation which was performed on this file. Go to the page *History* and scroll down. The last entry must be *Add Signature*.

Methods - Add Signature/Show History - D:\opus\MGIT\MATRIX-F\_1.5\_m\_Solid\_Probe\_Fibre\_3\IT\SET\IT.XPM

Signature | History

Load Method      Measurement Experiment (\*.xpm)      Add Signature

Print Signature

**21 CFR 11**

	First Name	Last Name	Meaning	Category	Date	Time
1	Bruker	Optik	qualified	Release	2002/01/08	15:31:21
2	Bruker	Optik	qualified	Release	2002/01/22	12:14:23

Methods - Add Signature/Show History - D:\opus\MGIT\MATRIX-F\_1.5\_m\_Solid\_Probe\_Fibre\_3\IT\SET\IT.XPM

Signature | History

Print History      (use Landscape)

	A	B	C
148	<b>Save an Experiment File</b>		<b>2002/01/22 12:10</b>
149			
150	<b>Sample Parameter</b>	<b>Old value</b>	<b>New value</b>
151	Operator Name	Default	Bruker
152			
153	<b>Acquisition Parameter</b>	<b>Old value</b>	<b>New value</b>
154	Acquisition Mode	4444AQR	Double Sided,Forward-Back
155			
156	<b>Optic Parameter</b>	<b>Old value</b>	<b>New value</b>
157	Low Pass Filter	2710PGN	10 KHz
158	Source Setting	On	NIR
159	Scanner Velocity	2710VSC	10 KHz
160			
161	<b>Optic Parameter</b>	<b>Added</b>	
162	Beamsplitter Setting	Quartz	
163			
164	Add Signature	Signature	2002/01/22 12:14
165			

If you work in 21 CFR 11 mode and you changed Instrument Test method files (see chapters 8 and 14), you must sign them before starting the Instrument Test.

Go to the *Setup* menu and start the function *Signature Setup*. Specify a *Signature Record* and click on *Store*. An example is given in the following figure.

The screenshot shows the **SignatureSetup** dialog box with the following details:

- 21 CFR 11** logo in the top left corner.
- Navigation tabs: **Setup Record** (selected), **Global Options**, **Audit Trail**.
- Record list: **1 Signature Records** with navigation buttons **<<**, **1**, and **>>**.
- User ID:** Service
- Password:** [masked]
- Password Verification:** [masked]
- Password expires:** Never
- First Name:** Bruker
- Last Name:** Optik
- Definition of Signature Meaning:**
  - Category: Release and Lock  
Meaning 1: locked
  - Category: Release  
Meaning 2: qualified
  - Category: Review  
Meaning 3: [highlighted in yellow]
  - Meaning 4: [highlighted in yellow]
  - Meaning 5: [highlighted in yellow]
- Lock User**
- Delete Record** button
- Bottom buttons: **Store**, **Cancel**, **Help**

Then start the function *Methods – Add Signature / Show History*, load and sign each Instrument Test method file you have changed. For signing click on the button *Add Signature*.





## 16. Installation of further Instrument Test configurations

If you have forgotten to install all Instrument Test configurations which you are interested in, or if you got new equipment (e.g. detector or fibre), it's possible to install further configurations with the OPUS CD. Start the OPUS installation in the usual way, but on the page *Select Components* only the item *Instrument test* should be checked. In this case an existing OPUS installation is not overwritten, only the new Instrument Test configurations are added to the selected directory.

