RI Retieval In Labview

User Manual

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Introduction

This software retrieves the real and imaginary part of a material’s refractive index for multiple wavelengths. It accomplishes this by best fitting theoretical (Mie theory) extinction cross sections including multiple charge contributions to measured extinction cross sections for a number of size parameters. The best fit procedure of minimizing chi squared enables us to predict the estimated uncertainty (one standard deviation) in both the real and imaginary best fit parameters. The users can also select which size will be included in the curve fit, decide if they want to restrict the search to positive real part, and to incorporate extinction or/and diameter factor to correct for invalid calibration.

Installation

Simply run setup.exe and follow through with the installation wizard.

Operation

1. Locate the executable RI Retrieval in Labview.exe and double click it. You will the a window as is shown in Figure 1. Please disregard all data that is shown in windows. It will be updated with your measurements later on.
2. Choose Extinction Cross Section File (format is given in the appendix) using the browse button, Shown in Figure 2. This will update both the diameter list shown on the left and the extinction data graph on the right. It will also update the list of available wavelengths.
3. Choose a multiple charge data file. A corresponding distribution graph will be updated on the right. These two files can be generated in IGOR script written by Michel.
4. Wavelength range is automatically selected to include all wavelengths in file. You can choose to minimize the range and even select just a single wavelength by choosing the same wavelength in both the minimum and maximum selections.
5. For basic usage, leave Use Factors uncheck, as it is by default. I will devote a separate section that is relevant to this option.

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| Figure 1 – Main Application Window |

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| Figure 2 – Input data files and choose parameter for the RI retrieval run |
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| C:\Users\Weizmann\AppData\Local\Temp\VMwareDnD\6d09fedc\image[2].png |
| Figure 3 – Shutter is set to “Fully Auto” – smear effect is extinguished |

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| C:\Users\Weizmann\AppData\Local\Temp\VMwareDnD\6f80f96f\image[3].png |
| Figure 4 – Shutter is set to “CLOSED for background”. The smearing is fully evident |
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| C:\Users\Weizmann\AppData\Local\Temp\VMwareDnD\713799b0\2012-07-09 15.51.47.jpg |
| Figure 5 – Hg and Ar spectral lines |
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Appendix

Format of Extinction file

Format for multiple charge size distribution file