

Wavelength Selection

Find YOUR Absorption Line

TECHNICAL NOTES

ESD Precautions

Thermal
Management

DFB Laser Concept

Tunable Diode
Laser Absorption
Spectroscopy

Reliability

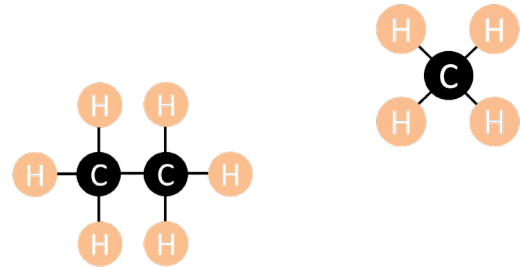
Wavelength Selection

nanoplus manufactures **tunable DFB lasers at EVERY wavelength** for Tunable Diode Laser Absorption Spectroscopy (TDLAS): [Distributed Feedback Lasers](#), [TDLAS applications](#).

To **determine YOUR specific wavelength** or tunable wavelength range for **YOUR application**, the following three tools are useful. Additionally, refer to our [literature database](#) for more details.

Software Tools:

- HITRAN DATABASE
- SPECTRAPLOT
- SPECTRAL RANGE MANAGER

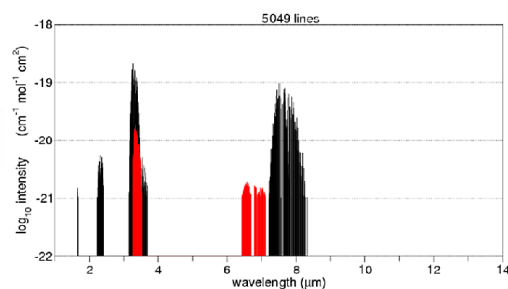


1) Using HITRAN for Absorption Line Overview

The [HITRAN database](#) provides an overview of absorption lines for different gases. For example, if you aim to detect CH₄ (methane) and C₂H₆ (ethane) simultaneously, you can use [SpectraCalc](#).

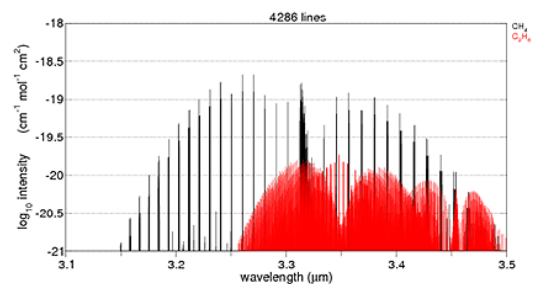
Example Analysis:

The results suggest that the region between **3.1 μm and 3.5 μm** is a good choice.



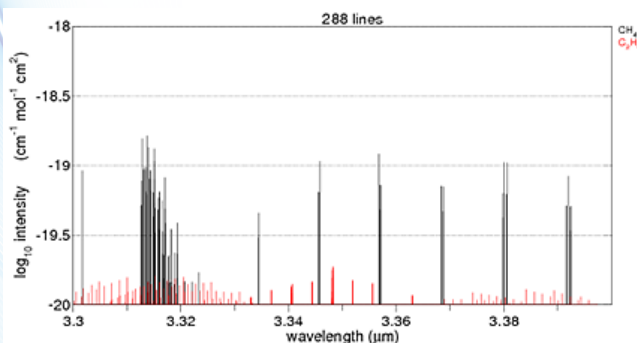
spectralcalc.com

A more refined result indicates that the range from **3300 nm to 3400 nm** is particularly promising.



spectralcalc.com

To determine the exact absorption lines to use, further analysis is needed.



spectralcalc.com



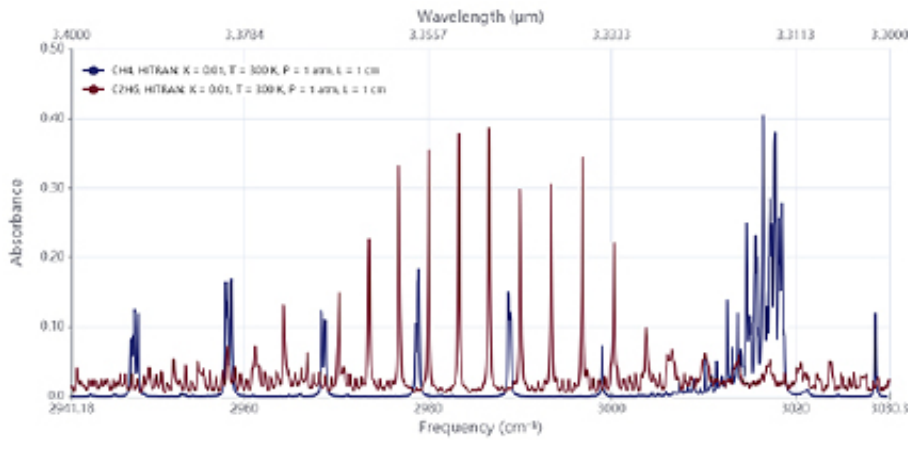
Wavelength Selection: Hitran, SpectraPlot & SRM

2) Refining Results with SpectraPlot

[SpectraPlot](#) provides more details on the absorption characteristics.

Example Analysis:

Without adjusting concentration levels, this tool allows visualization of absorption peaks.



Combining the results from HITRAN and SpectraPlot helps pinpoint optimal absorption lines for your specific application.

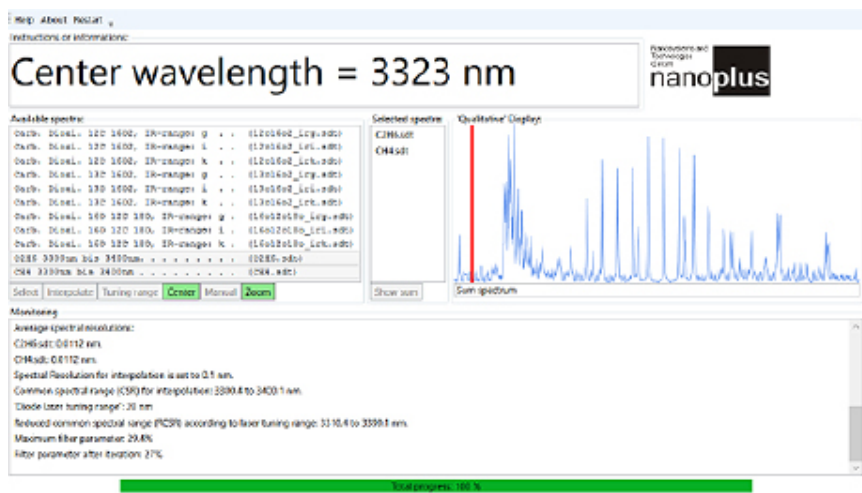
3) Using the Spectral Range Manager (SRM) for Optimal Line Selection

The Spectral Range Manager (SRM) is a tool designed to recommend optimal absorption lines for your application. Its functionality is described in detail in this [scientific article](#).

nanoplus provides the corresponding software as a [downloadable resource](#) on our website. The download includes comprehensive instructions for installation and usage.

Example Application:

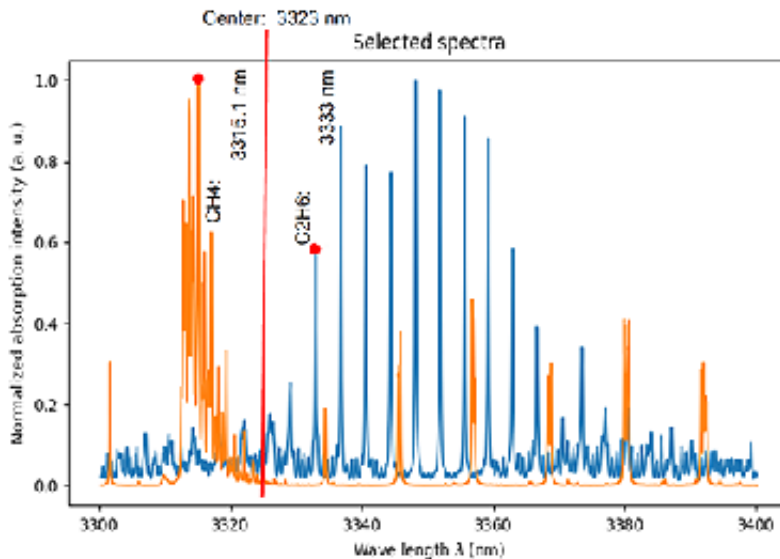
If you use a laser with ± 10 nm tuning (such as an external cavity laser or OPO), you can select two strong absorption lines of your target gases within the 20 nm tuning range.



Rev.SRM.01

Wavelength Selection: Hitran, SpectraPlot & SRM

Note: The following plot is not generated by the tool but can be created using Tool 1) HITRAN or 2) SpectraPlot, or by using your own script.



If you use a DFB laser **with a narrower tuning range (± 1 nm)** and/or want to **avoid the strong CH₄ peaks at 3315 nm**, an alternative selection might be **3030 nm to 3070 nm** for CH₄ and C₂H₆.

Generating Custom Spectra Files

Only a few example spectra files are included with the software—users are expected to create their own files.

- Generate new **.sdt spectra files** to match your laser specifications.
- The process of creating spectra files is detailed in the accompanying “**AboutSDT**” PDF.

For further assistance, please refer to the provided documentation or contact [nanoplus support](#).

Conclusion:

By leveraging HITRAN, SpectraPlot, and the Spectral Range Manager, you can identify the optimal absorption line for your application. Use these tools to refine your selection and ensure compatibility with your tunable laser system.

links

Hitran Database, <https://web.cfa.harvard.edu/hitran/>

Spectral Plot, <https://spectraplot.com/absorption>

Spectral Range Manager, <https://nanoplus.com/library/downloads-tools>

Need assistance? Our team is happy to help, [contact us](#).