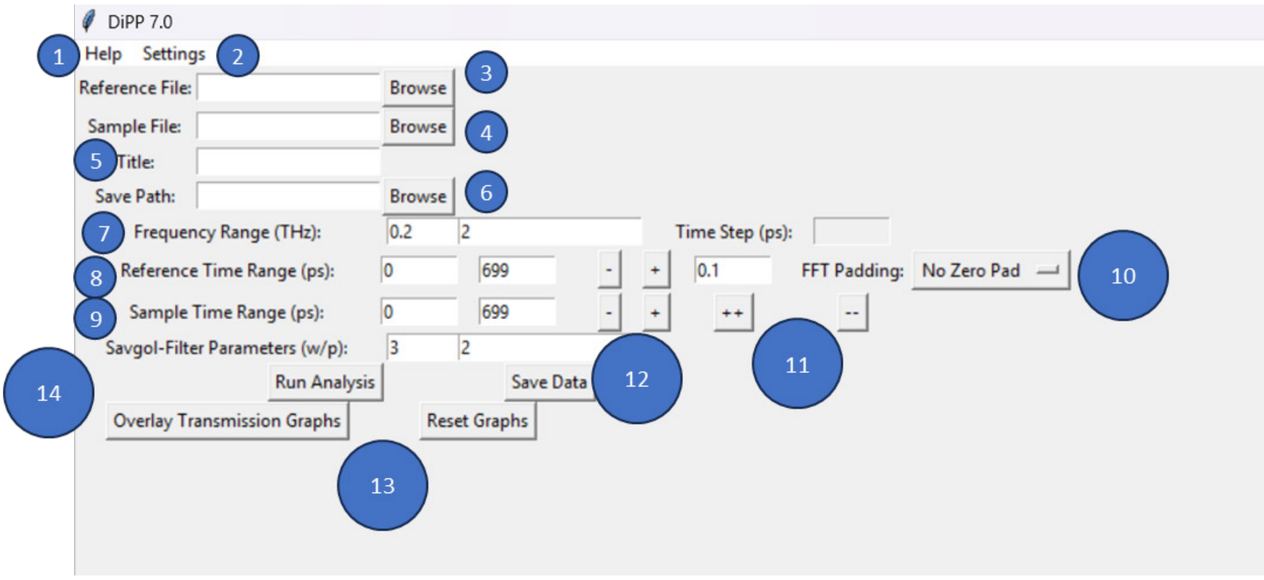
Dipp – Manual

Dipp is a free GUI software, fully based on python to calculate and analyse the **transmission coefficient** of a sample in the terahertz (THz) spectrum. The time-domain data of sample and reference are required for this purpose. The DiPP executable file (.exe) can be run on any Windows platforms without requiring python installation. The source file (.py) is also included for modifications by the user.



1. **Help menu:** Manual for operating the DiPP software
2. **Settings menu:** Choose between dark/light mode. Change the default values in the input fields.
3. **Reference file:** Choose the reference time-domain file. It is preferred to remove any header in the files. The file must be in a two-column format. The first column of the file must be time in picoseconds and the second column must be voltage/signal strength (as measured from the lock-in amplifier).
4. **Sample file:** Choose the sample time-domain file. Same format as in 3.
5. **Title:** Adds this title to the filename of the output files. Can be left blank too, If you don't want to save the results and only just view.
6. **Save path:** Choose the folder for the output files.
7. **Frequency Range (THz):** Sets the frequency range in terahertz of the transmission coefficient to be calculated.
8. **Reference Time Range (ps):** Enter the time-range of the reference signal in picoseconds. This can vary for different setups. This helps in removing the "echoes" from the sample to avoid Fabry-Perot effects in the results.
9. **Sample Time Range (ps):** Enter the sample time-range. Note that both the time ranges (sample and reference) can be varied independently for better results.
10. **FFT Padding:** Choose between no 0-padding and 0-padding for 1 GHz resolution in frequency domain.

11. **Trim controls:** ++ and – button helps in fine cropping of the time-domain signal by the number (ps) entered in the field above. It does simultaneously for the sample and the reference signals.
12. **Special trim controls:** + and – buttons allow fine cropping of individual reference and sample time-domain signals for improving the result.
13. **Output buttons:**
    - Run analysis: Computes the transmission with the user entered inputs.
    - Save data: Saves the output files. It saves 5 files. For example, if the user entered title is alice. The five output results will be:
        i. t_alice : transmission coefficient. File contains frequency in THz and transmission coefficient.
        ii. t_fit_alice : smoothed transmission coefficient using savgol-filter.
        iii. td_trans_alice : A png file of the graphs displayed in the interface.
        iv. samphase_alice : Unwrapped phase spectra of the sample, where the phase is in radians.
        v. refphase_alice : Unwrapped phase spectra of the reference.
    - Overlay transmission graphs: Overlays all the transmission plots on a single graph for all previous runs.
    - Reset graphs: Resets the plots. Clears all the previous plots from the memory too.
14. **Savgol-filter parameters (w/p):** Applies the savgol filter on the transmission for smoothing. The smoothing is proportional to the ratio of w and p. w must always be greater than p.

DiPP developed by Rohith K. M. Credits to Chatgpt 4o for assisting in GUI.

Take a look at my research here https://www.researchgate.net/profile/Rohith-K-M