# EEG Analysis

Here's how you can interpret this type of PSD plot:

- Power Distribution: The height of the plot at a particular frequency indicates the power of the signal in that frequency band. Higher values indicate more power in that frequency band, while lower values indicate less power.
- Frequency Bands: Different frequency bands can be identified by looking at the frequency axis. For example, delta waves are typically found in the 0.5 to 4 Hz frequency range, theta waves are found in the 4 to 8 Hz range, alpha waves are found in the 8 to 12 Hz range, beta waves are found in the 12 to 30 Hz range, and gamma waves are found in the 30 to 100 Hz range.
- Dominant Frequency: The frequency with the highest power is considered the dominant frequency and is often used to represent the EEG signal in that frequency band.
- Artifacts: Artifacts such as eye blinks, muscle movements, and power line interference can cause peaks in the PSD plot. These artifacts can be easily identified by looking for sudden spikes in the power values
- Comparison Across Channels: By comparing the PSD plots across different EEG channels, you can identify differences in the power distribution and dominant frequency. This can be useful in understanding the spatial distribution of brain activity and the differences between brain regions.
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The following are the commonly accepted interpretations of the various EEG frequency ranges:

1. Delta Waves (0.5 to 4 Hz): Delta waves are the slowest and largest of the EEG frequency bands. They are typically associated with deep sleep and unconsciousness.
2. Theta Waves (4 to 8 Hz): Theta waves are faster than delta waves and are typically associated with drowsiness, relaxation, and meditative states.
3. Alpha Waves (8 to 12 Hz): Alpha waves are even faster and are typically associated with relaxation and a state of calmness and mindfulness. Alpha waves are often observed when a person is awake but has their eyes closed and is in a state of rest.
4. Beta Waves (12 to 30 Hz): Beta waves are the fastest of the EEG frequency bands and are typically associated with a state of alertness, focus, and concentration.
5. Gamma Waves (30 to 100 Hz): Gamma waves are the fastest of the EEG frequency bands and are associated with higher cognitive processing and information processing.