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FORTGESCHRITTENEN PRAKTIKUM

Titel

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Abstract:

Kurze Umschreibung

Bereich	max. %	+/-	erreicht %
Einleitung & Theorie	15		
Durchführung Auswertung phys. Diskussion Zusammenfassung	70		
Formales	15		
Note			

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Inhaltsverzeichnis

1	Einleitung	2
2	Theorie	2
3	Experimental buildup	2
3.1	Execution and results	2
3.2	Identification of the lines and measurement of the absorption	2
3.3	Diskussion	3
4	Fazit	3

1 Einleitung

2 Theorie

3 Experimental buildup

The experimental buildup was developed as part of Staatsexamensarbeit in 1978. A sketch of the buildup can be seen in figure ??.

The main part of the buildup is the microwave generator, the generator produces waves with a frequency between 18Hz and 27Hz. The waves get directed via a system of waveguides. With an attenuator and a phase shifter the underground signal can be reduced, so the absorption lines are better to see. For measuring the frequency of a peak a wave meter is used, because the resolution of the generator is not high enough. The wave meter uses a cavity, witch drains energy from the system in the case of resonance. For the measurement of the absorption energy is measured with a top diode, witch is connected to a Oscilloscope and a PC for visualization and measuring the signal. The wave guide system is connected with a vacuum pump, to reduce the influence of other gases than the NH₃. The amount of NH₃ can be controlled with a precision valve.

3.1 Execution and results

In this section the execution and the results will be presented.

3.2 Identification of the lines and measurement of the absorption

In this measurement all 39 theoretical expected lines in the spectrum should be measured. At first the pressure for this measurement has to be around 10^{-1} mbar and constant. The pressure during the measurement was at $9,8 \cdot 10^{-2}$. The measurement started at the 28GHz, because the peaks in that range are bigger then the ones at the beginning of the spectrum. For the measurement of the peaks the wave meter was used. The dip from the wave meter was position right on the dip of the NH₃ and the frequency was the take from the wave meter. Then the oscilloscope was used to determine the hight of the peaks. For that the dip of the wave meter was scrolled out of the visible spectrum on the oscilloscope. Then the to bars on the oscilloscope were used to determine the size of the dip.

With the size of the dip the absolute absorption coefficient can be calculated. The absolute absorption coefficient is calculated by formula 1. U_0 was not know so the coefficients where normed to the size of the the 6 6 peak, so $\alpha_{rel_{6,6}} = 1$. All measured Date can be find in table ??.

$$\alpha_{rel} = \frac{10}{l} \cdot \ln\left(1 - \frac{U_a}{U_0}\right) \quad (1)$$

l	length of the wave guide, 5m in this buildup
U_a	the intensity without any absorption
U_0	the intensity of the measured peak

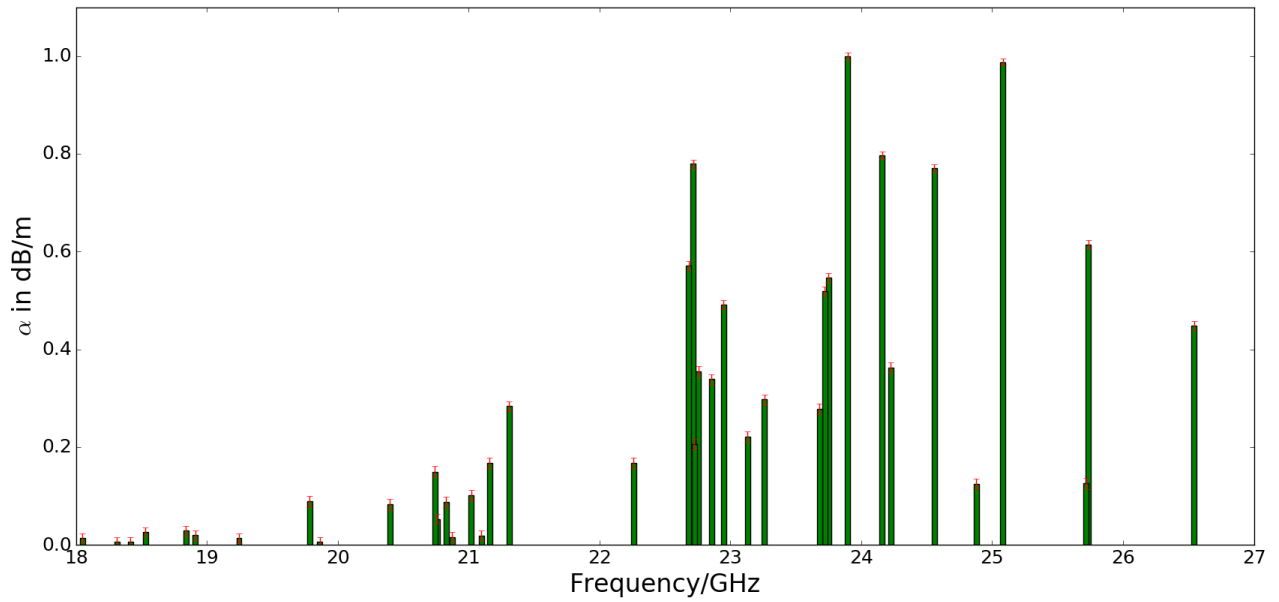


Abbildung 1: The plot shows the relative absorption coefficient, the coefficient was calculated with formula ???. The errors were taken from the uncertainty of the listing

3.3 Diskussion

4 Fazit