

Photodiode Étienne

These photodiodes were developed by Étienne in cooperation with the AEI and altered to peak at about 16.2MHz.

Schematics Used

- Schematic
- Interactive Schematic
- HAMAMATSU S5971: Photodiode @ 960NM, 100MHz

Notable Changes Made

To achieve a peak at around 16.2MHz, components had to be changed.
Changed components:

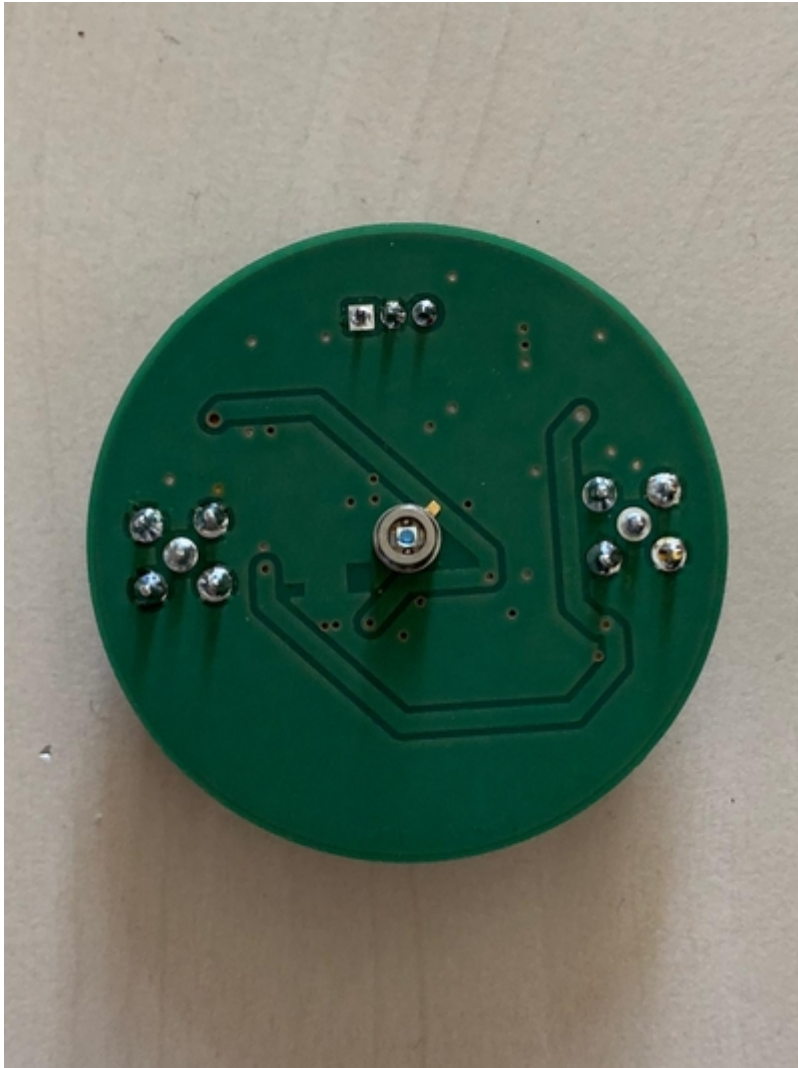
	Schematic Component	Used Component
L1	6u8	6u8
C3	6p	2 x 4.7p
R2	40.2R	40.2R
	Changed only for the 3rd and 4th build	
U5	AD587	LT1236A-10
C19	1u	none

- For Coil L1 the part [1812CS-682XJLC](#) (or at least a part with the same form factor) has to be used
- C3 influences at which frequency the peak will be
- Instead of the AD587, LT1236A-10 can be used
 - When doing this, the C19 component must not be soldered.
 - C19 connects pin 8 of U5 to ground. Pin 8 is not in use in LT1236A-10.

Using The Photodiode

- The photodiode requires a power input of +/- 15V
- AC Output: right SMA connector
- DC Output: left SMA connector
- When using a spectrum-analyzer (e.g. RIGOL DSA815) in combination with the ROHDE&SCHWARZ signal-generator, a 50Ω terminator must be used, too





Measured Data

The

traces

of the amplitude and phase were measured.

- A **RIGOL Network Analyzer** was used to gather that data from the AC output
- A 9V test-laser with a modulation of -10dB @ 100MHz was used in this experimental setup
- The traces of the diodes were fitted in

Python

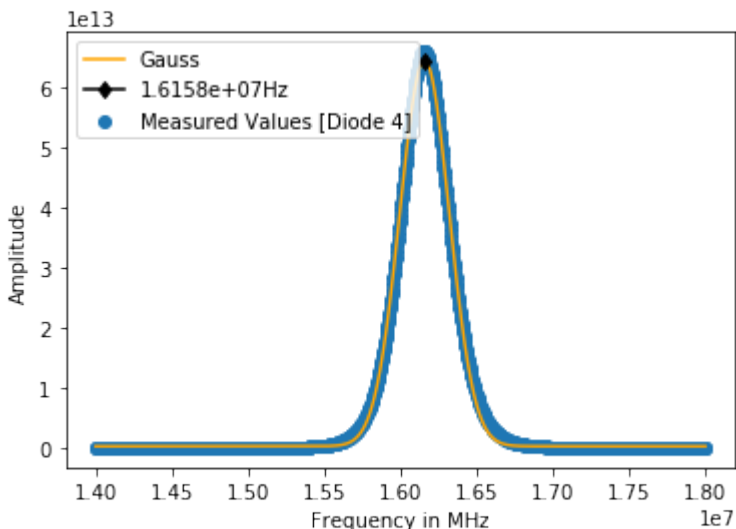
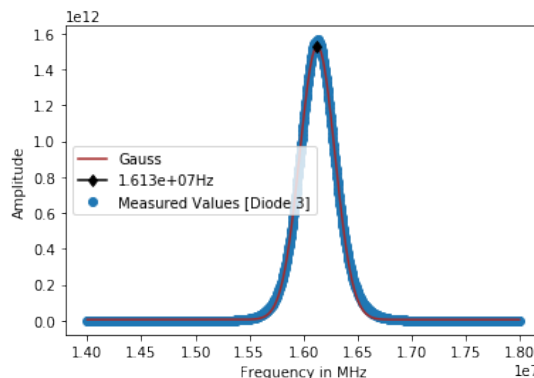
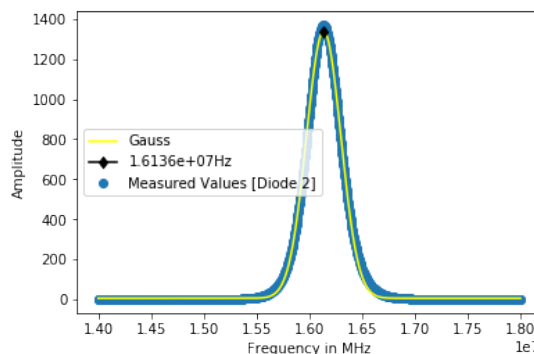
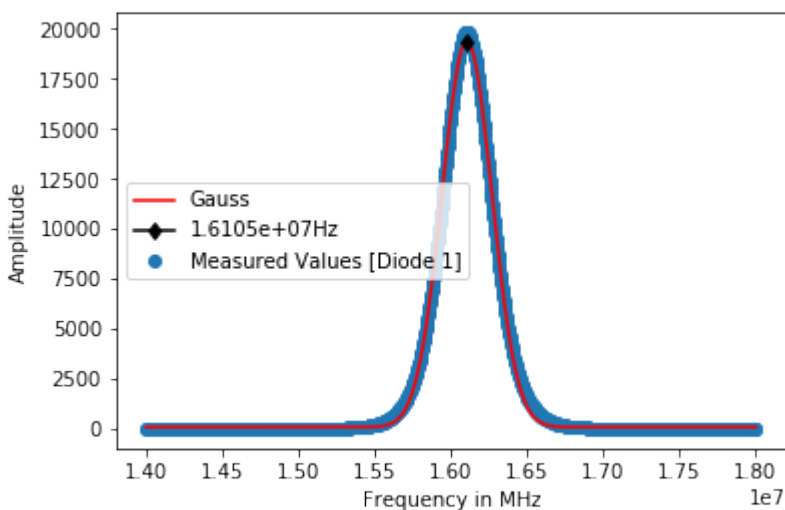
The results:

Diode	Resonance frequency [MHz]	Peak to 15MHz Ratio [dB]	P14R [dB]	P17R [dB]	P18R [dB]	FWHM with Gauß-Fit [kHz]	Phase #1	Comment
1	16.11 [+/- 0.015]	8.65	13.71	6.99	12.44	271.75		

Diode	Resonance frequency [MHz]	Peak to 15MHz Ratio [dB]	P14R [dB]	P17R [dB]	P18R [dB]	FWHM with Gauß-Fit [kHz]	Phase #1	Comment
2	16.14 [+/- 0.01]	8.92	13.46	6.53	11.34	270.98		
3	16.13 [+/- 0.01]	9.17	14.75	6.66	12.13	271.45		
4	16.16 [+/- 0.01]	9.39	14.81	6.5	12.09	269.72		

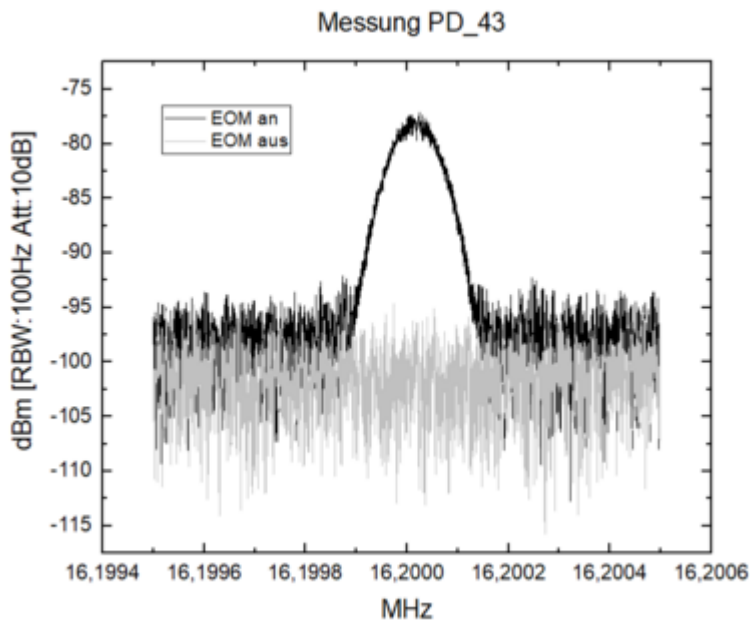
#1 Was bedeutet P17 etc? #2 Peak to 17MHz Ratio [Name sollte besser noch geändert werden]

- X = M_{ax} dazu Y Wert = Peak hight over ..
- Es fehlt der Fehler von der Linienbreite und des Max Peaks
- Höhe des Resonanz-Peaks über Rauschen



Wechselwirkung (WW) EOM und PD Nr.4

Spektrometer Rhode&Schwarz RBW: 100Hz VBW: 10Hz SWT: 30s Ref: 0dBm Att: 10dB



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