

## パルスファイバーループリングダウン分光法における光強度変調器バイアス電圧の影響に関する研究

## Study on the Effect of Intensity Modulator Bias Voltage on Pulsed Fiber Loop Ring-down Spectroscopy

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Fiber loop ring down (FLRD) technology has been widely used to detect many physical quantities such as temperature and pressure for the past few years, with low cost and large-scale multi-function sensor network improvement [1]. In the previous paper, researchers usually focus on laser source or sensor head to improve the accuracy. However, in this paper, we provide a new point, bias voltage, to optimize the precision of the pulsed fiber loop ring-down system. Figure 1 shows the experimental setup of the system. Figure 2 shows an example of the photodiode detector output with exponentially decaying signals in a nonresonant experiment. However, an apparent fluctuation in the decay significantly impacts the result. Coincidentally, we found it caused by the bias voltage of the intensity modulator. Figure 3 shows the exponential decay with the correct bias voltage. Figure 4 plots the loss of the system.

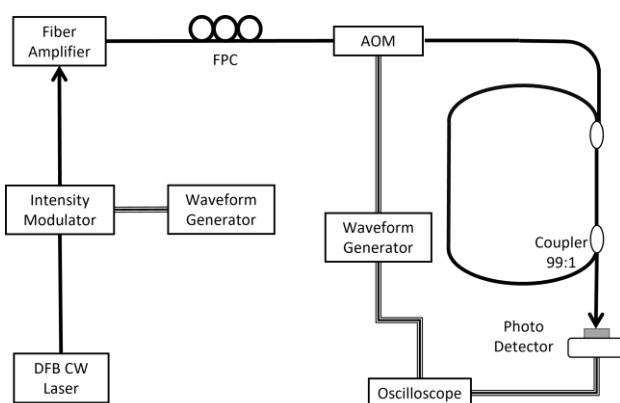


Fig.1 Experimental diagram

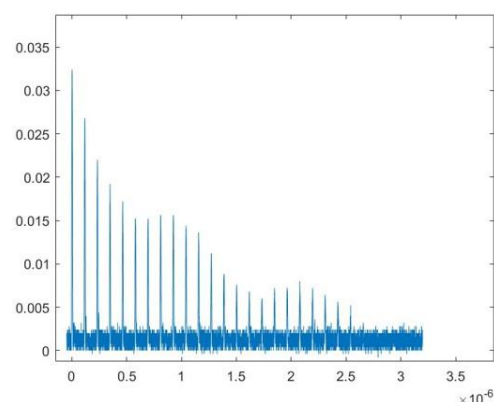


Fig.2 Exponential decay of nonresonant experiment

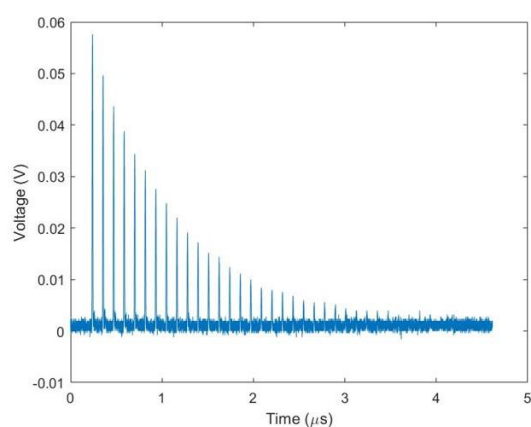


Fig.3 Exponential decay of nonresonant experiment

with correct bias voltage

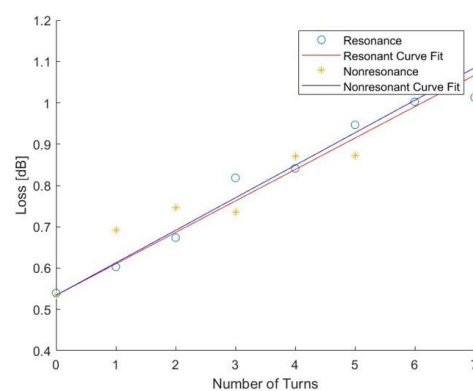


Fig.4 Loss detection

[1] Gagliardi, Gianluca, and Hans-Peter Loock, eds. Cavity-enhanced spectroscopy and sensing. Berlin, Germany Springer, 2014.