

Ex. Student project: Refractive index measurement of glass and polymer

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You should put abstract here. Briefly describe what you've done and the main idea of your project in "abstract". Generally the abstract contains 60 to 100 words. Using 2 or 3 sentences to clearly define your work and point out the main idea in it.

I. INTRODUCTION

You should introduce the whole background and make short discuss in this section just like pre-report in previous laboratory experiment. There may be a lot of method to practice your idea, you have to tell me why choosing one of them but not others. Collect and read journals or reliable reference articles to help you listing the advantage and disadvantage of these method.

Here is an example of citation[1–3] and book citation [4].

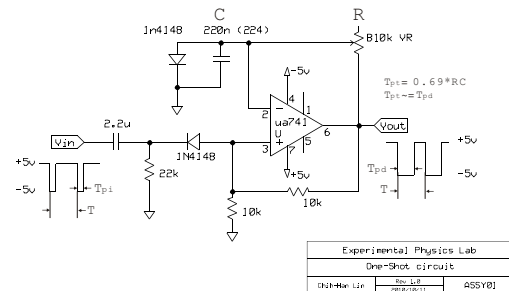


FIG. 1: This is test-pic picture

II. THEORY OR METHOD

You can express the main idea of your project in this section. Use $\$...\$$ to present inline math equation. For example, $\$a_1^2+a_2^2=c_1^2\$$ will show $a_1^2+a_2^2=c_1^2$ in paragraph. If you want to type numerated independent equations, you can use `eqnarray` environments.

```
\begin{eqnarray}\label{example-eq}  
a_1^2+b_1^2&=&c_1^2 \ \\  
a_2^2+b_2^2&=&c_2^2.  
\end{eqnarray}
```

will display follows:

$$a_1^2 + b_1^2 = c_1^2 \quad (1)$$

$$a_2^2 + b_2^2 = c_2^2. \quad (2)$$

III. CHARACTERISTIC OF THE SENSOR

You need to specify the sensor used in your own experiment during 3-weeks project.

IV. EXPERIMENTAL SETUP

A. refractive index of glass

Using `\subsection` to generate a subsection.

B. refractive index of polymer

Use `figure` environment to include figures in \LaTeX documents. It better for you to edit your data plot or picture with Inkscape or other vector graphic editor and save them as `.png` `.eps` or `.pdf` file. For example, following codes shows FIG. 1.

```
\begin{figure}  
\centering  
\includegraphics[width=0.4\textwidth]  
{test-pic.pdf}  
\caption{This is test-pic picture}  
\label{test-pic}  
\end{figure}
```

Commons `\label` and `\ref` are used to extract figure or equation number automatically generated by \LaTeX .

FIG.~ `\ref{test-pic}`

will show FIG. 1.

V. RESULT

Express your result and data plot here.

VI. CONCLUSIONS

Discuss and make conclusions here.

APPENDIX A: ARDUINO CODE

Command `\appendix` signals that all following sections are appendices. For example, the section “Arduino code” after `\appendix` has prefix “Appendix”. Use `verbatimim` environment to list your computing code as follows:

```
const int buttonPin = 2;
const int ledPin = 13;

// Variables will change:
int ledState = HIGH;
int buttonState;
int lastButtonState = LOW;

long lastDebounceTime = 0;
long debounceDelay = 50;

void setup() {
  pinMode(buttonPin, INPUT);
  pinMode(ledPin, OUTPUT);
}

void loop() {
  // read the state of the switch into
  //a local variable:
  int reading = digitalRead(buttonPin);

  // check to see if you just pressed
  //the button (i.e. the input went from
  //LOW to HIGH), and you've waited
  //long enough since the last press to
```

```
//ignore any noise:

// If the switch changed, due to noise
//or pressing:
if (reading != lastButtonState) {
  // reset the debouncing timer
  lastDebounceTime = millis();
}

if ((millis() - lastDebounceTime)
    > debounceDelay) {
  // whatever the reading is at, it's been
  //there for longer than the debounce delay,
  // so take it as the actual current state:
  buttonState = reading;
}

// set the LED using the state of the button:
digitalWrite(ledPin, buttonState);

// save the reading. Next time through
//the loop, it'll be the lastButtonState:
lastButtonState = reading;
}
```

ACKNOWLEDGMENTS

If you want to acknowledge someone, put the paragraph in `acknowledgements` environment. Ex. Chih-Han Lin acknowledges fruitful discussion and patient debugging with Chengfred, and partial support by department of Physics of NCU.

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- [1] P. Wölfle, Y. Dubi, and A. V. Balatsky, *Phys. Rev. Lett.* **105**, 246401 (2010).
 [2] C. Recher, M. Kieburg, and T. Guhr, *Phys. Rev. Lett.* **105**, 244101 (2010).
 [3] W. Bao, Z. Zhao, H. Zhang, G. Liu, P. Kratz, L. Jing,

- J. Velasco, D. Smirnov, and C. N. Lau, *Phys. Rev. Lett.* **105**, 246601 (2010).
 [4] A. Yariv, *Quantum Electronics* (Wiley, 1989).