



ICT-based Physics Experiment

Eksperimen Penentuan Konstanta Planck dengan LED dan Datalogging

Oleh

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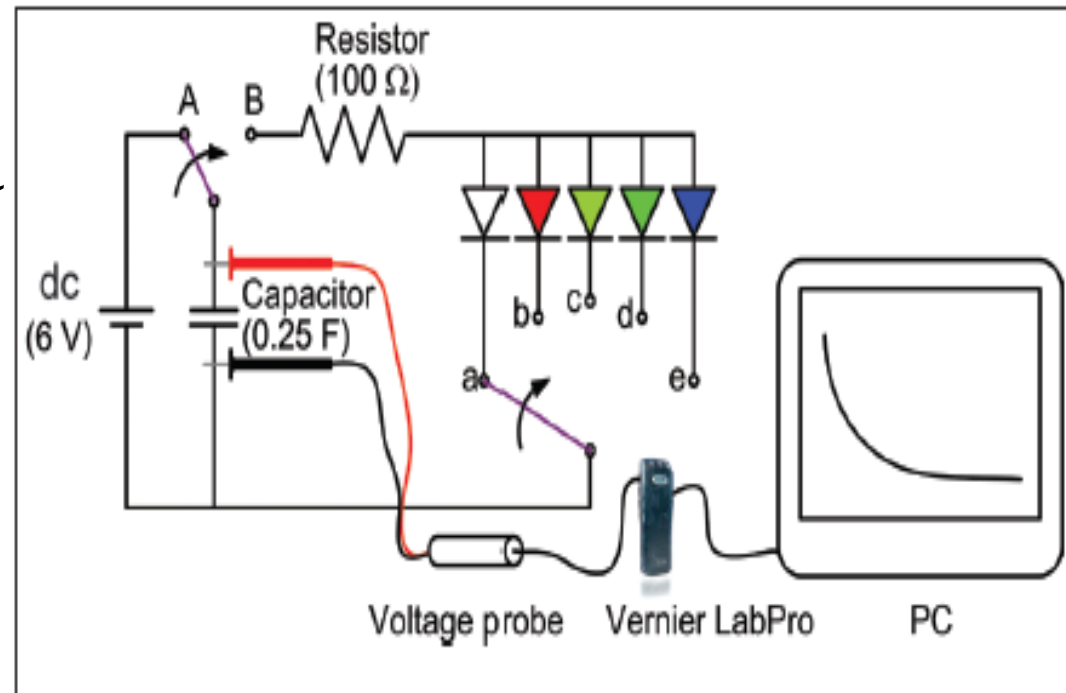
2015

Tujuan

- Melatih mahasiswa melakukan eksperimen aplikasi dalam penentuan konstanta Planck h berbasis datalogging

Perangkat

- Komputer/Laptop
- Software LoggerPro
- Apparatus Konstanta Planck dengan LED
- Sistem MBL (LabQuest mini interface, Voltage Sensor)

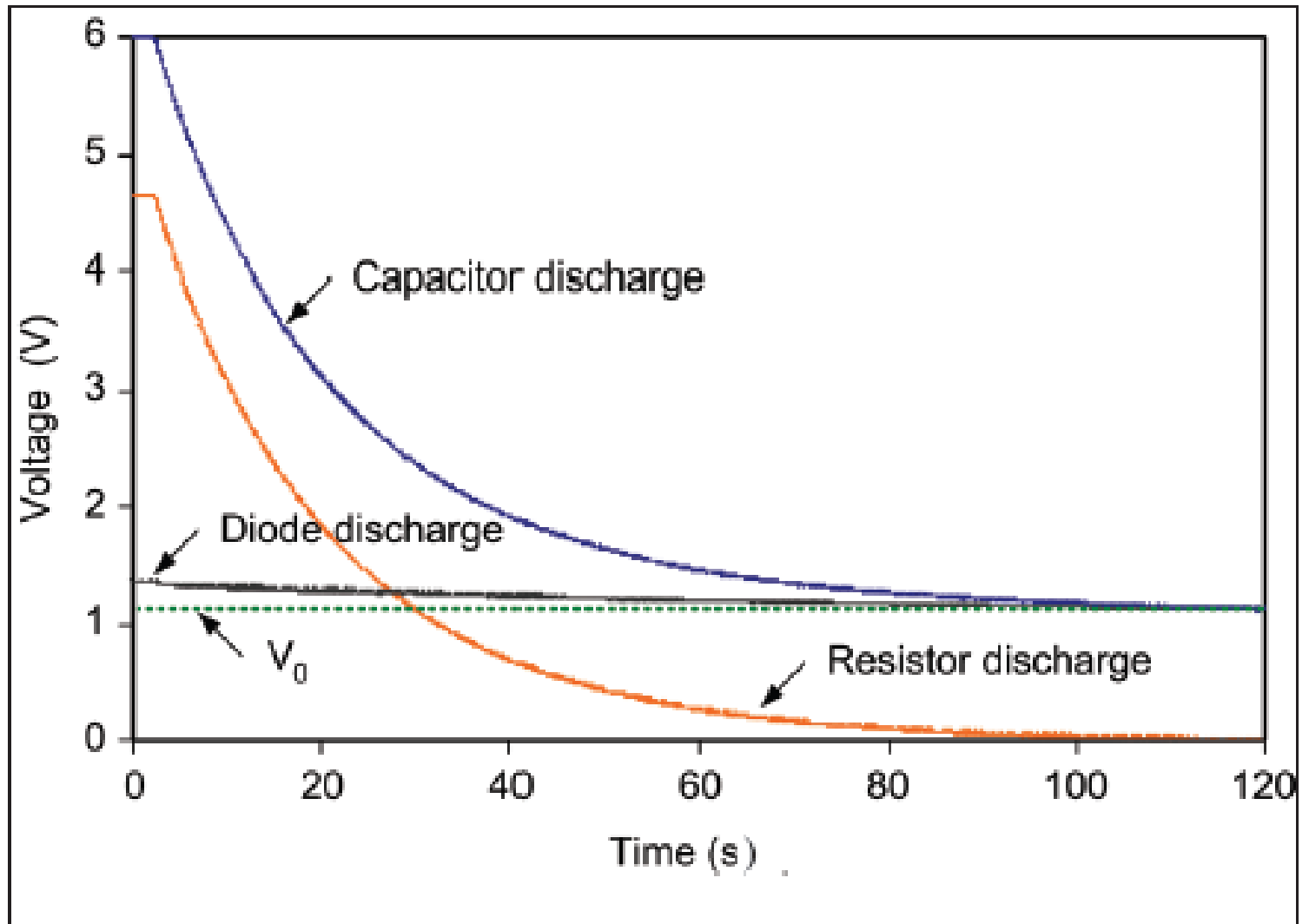


Teori

The voltage across the resistor approaches zero and is proportional to the current in the circuit while the capacitor voltage decays exponentially from its initial maximum toward a lower limit. As a result, the voltage across the LED only varies slightly approaching its minimum value as the current through the resistor approaches zero. An exponential decay function of the form $V = Ae^{-\alpha t} + B$ fits the capacitor voltage discharge curves very well, while A, B, and α are constants

$$E = eB = eV_o \quad h = eV_o \frac{\lambda}{c}$$

Contoh Data Eksperimen



Contoh Data Eksperimen

Light Emitting Diode	Nominal Wavelength λ [nm]	Frequency f [THz]	$B (= V_0)$ [V]	Energy $E = eB$ [10^{-19} J]
blue	430	697.209	3.321	5.321
green	565	530.619	1.918	3.073
yellow	585	512.479	1.854	2.971
red	660	454.242	1.74	2.788
infrared	940	318.936	1.167	1.870