

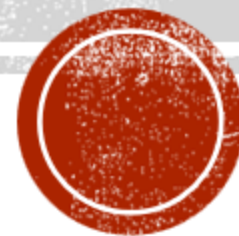
物理实验教学中心

Physics Experiment Center



MEASUREMENT OF ELECTRODYNAMIC POTENTIAL USING 11-CORD POTENTIAL DIFFERENCE METER

Li Bin
NJUPT

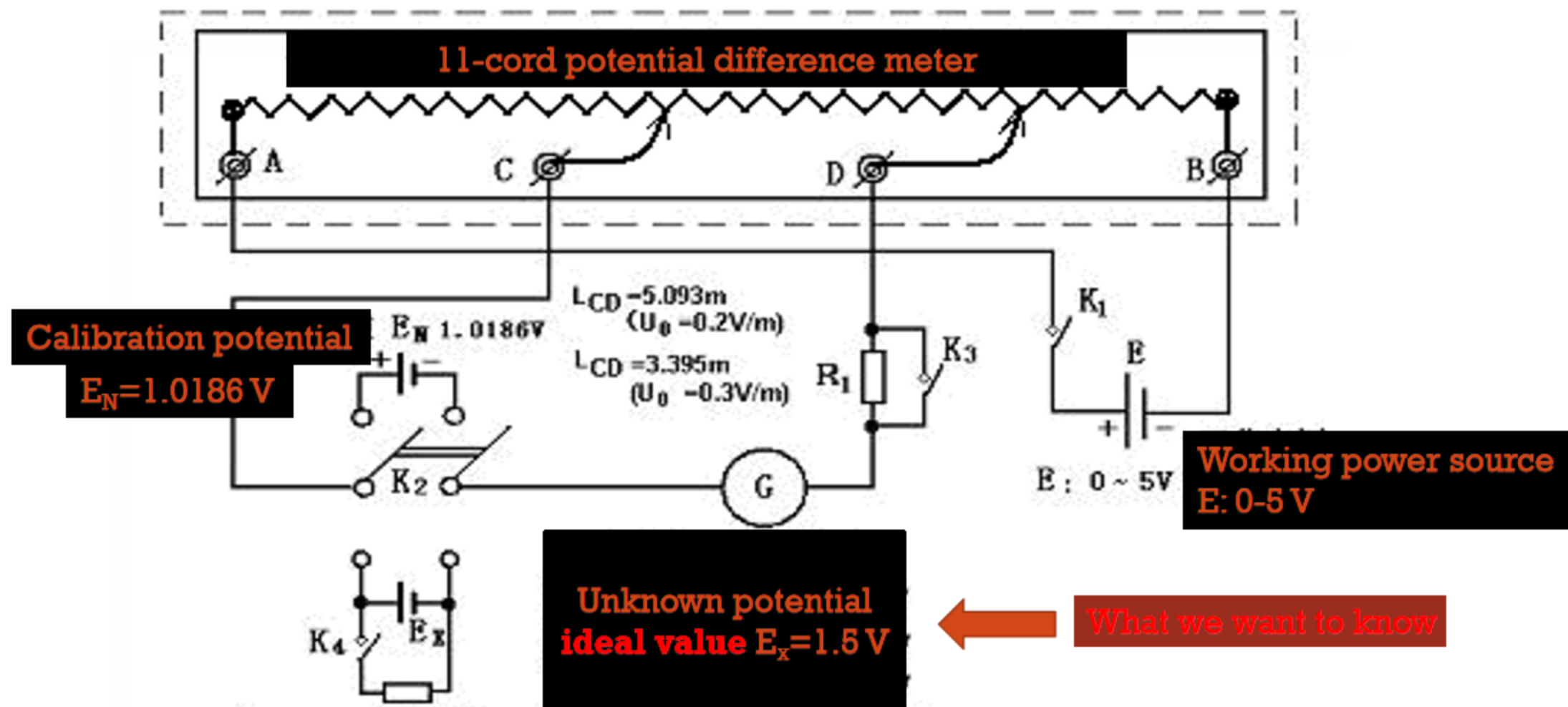


AIMS:

1. Know the compensation method.
2. Learn to use 11-cord potential difference meter.
3. Measure the electrodynamic potential (electric voltage).



Circuit Diagram



$E_N = U_{CD} = U_0 \cdot L_{CD}$, U_0 is called correction factor, L_{CD} is the length of the resistance wire between C & D
 $E_x = U_{CDx} = U_0 \cdot L_{CDx}$. E_N is known, if we know L_{CD} and L_{CDx} , we can obtain E_x .

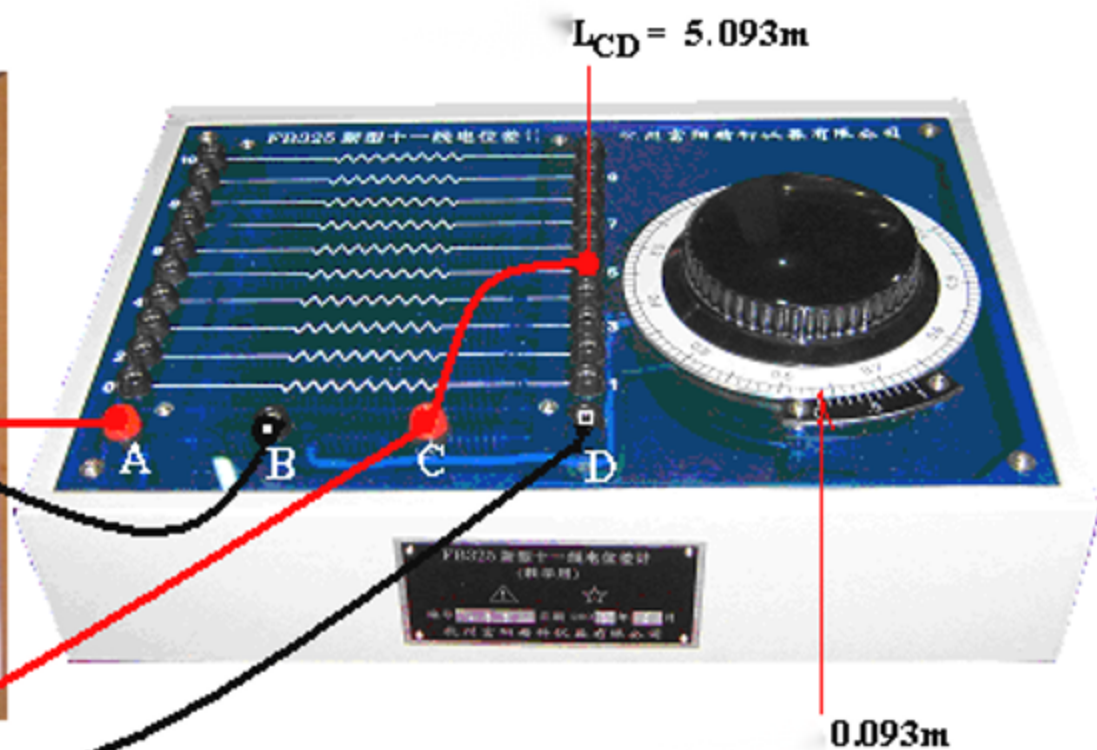
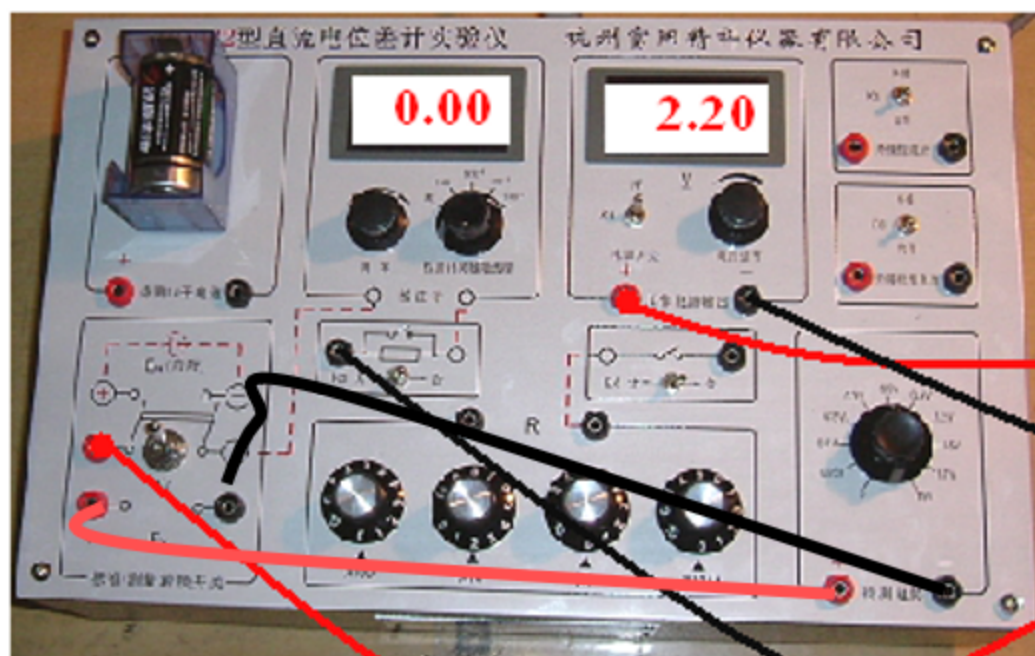


- $E_N = U_{CD} = U_0 * L_{CD}$, U_0 is called correction factor, L_{CD} is the length of the resistance wire between C & D.
- $E_x = U_{CDx} = U_0 * L_{CDx}$. E_N is known, if we know L_{CD} and L_{CDx} , we can obtain E_x .



galvanometer Voltmeter

division circle



Steps:

1. **Connect circuit;**
2. **Galvanometer zero adjustment;**
3. **Calculate L_{CD} for correction factor $U_0 = 0.2 \text{ V/m}$, using $L_{CD} = E_N/U_0 = 1.0186/0.2 = 5.093 \text{ m}$;**
4. **Regulate the length of CD to L_{CD} , adjust the voltage to make galvanometer displaying 0 at 10^{-8} gear;**
5. **Calculate the ideal L_{CDx} for correction factor $U_0 = 0.2 \text{ V/m}$, using $L_{CDx} = E_x/U_0 = 1.5/0.2 = 7.5 \text{ m}$;**
6. **Keep the voltage unchanged, adjust the length of CD to make galvanometer displaying 0 at 10^{-8} gear. Record the measured L_{CDx} ;**
7. **Calculate the actual value of $E_x = L_{CDx} * U_0$;**
8. **Change U_0 to 0.25 V/m , redo 3-7 steps.**



U_0 /(V/m)	E (voltmeter) /V	L_{CD} (calculated) /m	L_{CDx} (measured) /m	E_x /V
0.2		5.093		
0.25		4.0744		

$$E_x = L_{CDx} * U_0$$



HOMEWORK

- Please complete the report to describe this experiment, and find out more methods to measure the voltage.
- DL: November 9, 2023

- Useful link(s):

1. <https://github.com/bliseu/phylab>



END

