

Theory



A1-1

Official (English)

The Stern-Gerlach Experiment¹

Speed of the Silver Atoms

A.1 (0.5 pt)

Value of $v_z =$

The Basic Expression

B.1 (2 pt)

$\Delta x =$

The Inhomogeneous Magnetic Field

C.1 (1.5 pt)

$\vec{B}(x, y, 0) =$

¹H. S. Mani (former Director, HRI, Prayagraj) and Gautam Datta (DAIICT, Gandhinagar) were the principal authors of this problem. The contributions of the Academic Committee, Academic Development Group, and the International Board are gratefully acknowledged.

Theory



A1-2

Official (English)

C.2 (0.5 pt)

Direction at point R :

Direction at point P_0 :

C.3 (0.5 pt)

In the air gap region $\vec{B}(x, 0, 0) =$

The Force

D.1 (0.5 pt)

$F_x =$

The Field and the Field Gradient

Theory



A1-3

Official (English)

E.1 (2 pt)

$$B_P =$$

$$dB_P/dx =$$

The magnetic moment of the silver atom

F.1 (1.5 pt)

$$\mu_s =$$

The spread in the line on the screen

G.1 (0.5 pt)

$$\delta x =$$

Error in the evaluation of the magnetic moment of the silver atom

Theory



A1-4

Official (English)

H.1 (0.5 pt)

$$\delta\mu_s =$$