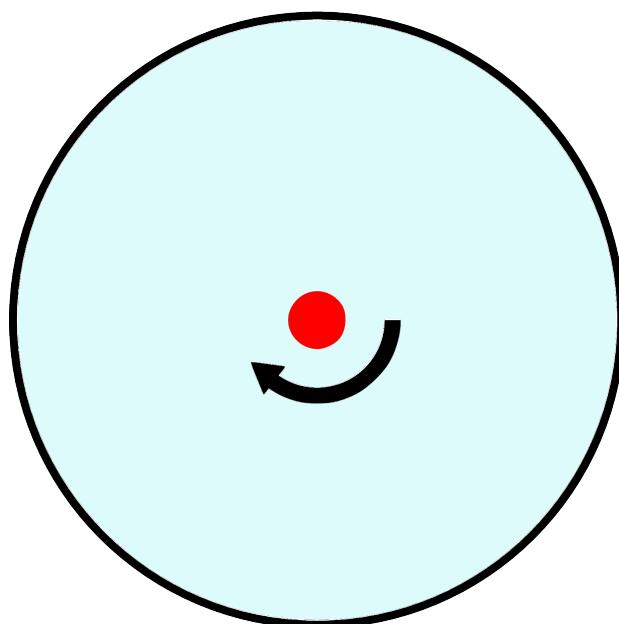


## 超流体中的涡旋

Part A 稳态涡旋丝 (0.75 分)

**A.1** (0.25 pt)

$v =$



**A.2** (0.5 pt)

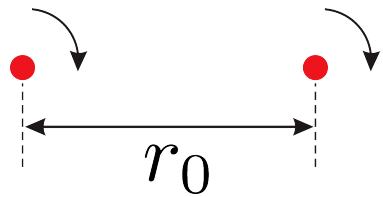
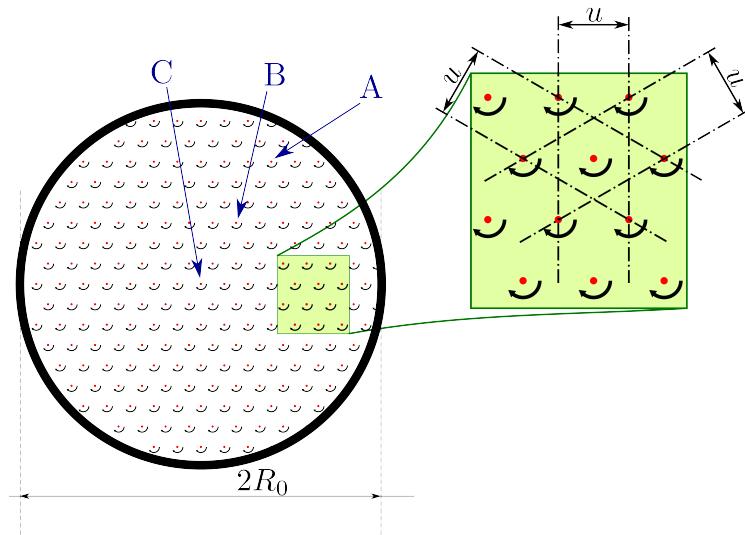
$z(r) =$



## Part B. 涡旋运动 (1.4 分)

**B.1** (0.25 pt)

$$v_0 =$$

**B.2** (0.15 pt)**B.3** (0.4 pt)

$$v(\vec{r}) =$$

**B.4** (0.35 pt)

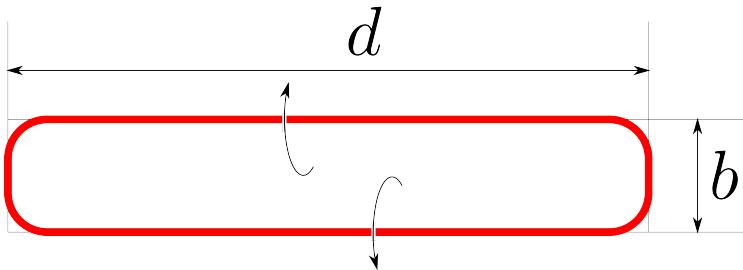
$$AB(t) =$$

**B.5** (0.25 pt)

$$z(\vec{r}) =$$

**Part C. 动量和能量 (1.75 分)****C.1** (0.3 pt)

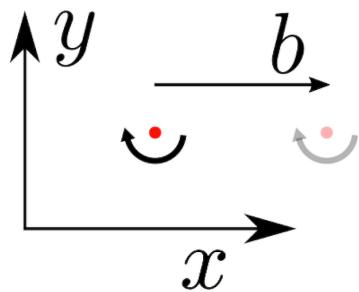
$$|\vec{P}| =$$

**C.2** (0.7 pt)

$$U =$$

**C.3** (0.75 pt)

$$|\Delta \vec{P}| =$$

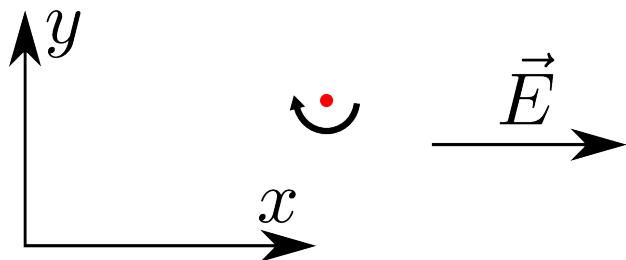
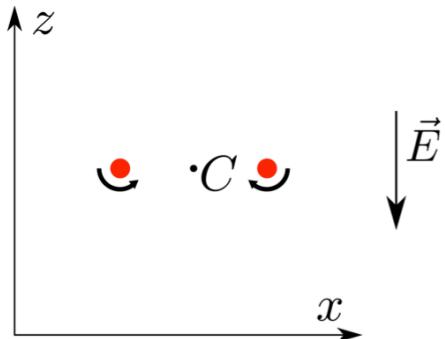




## Part D. 被捕获的电荷 (2.85 分)

**D.1** (0.5 pt)

$$v(t) =$$

**D.2** (0.6 pt)

$$R(t) =$$

**D.3** (1.5 pt)

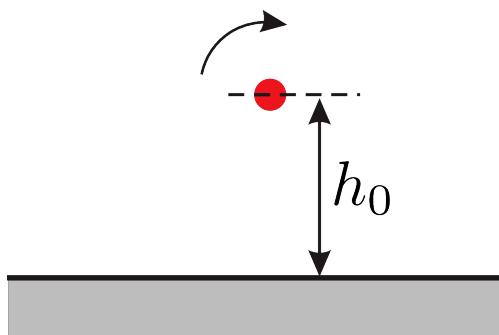
$$v(t) =$$

**D.4** (0.25 pt)

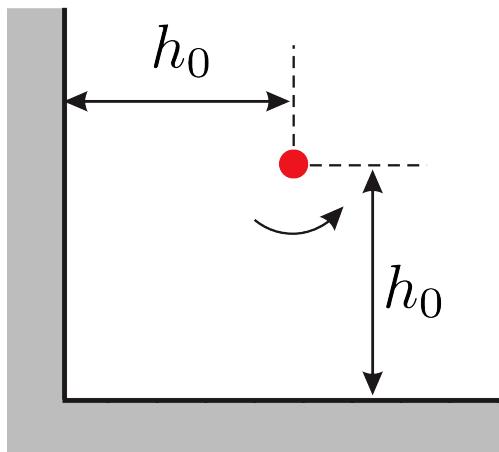
$$v(t) =$$

**Part E. 边界的影响 (3.25 分)****E.1** (0.5 pt)

$$v(t) =$$

**E.2** (0.75 pt)

$$v_0 =$$

**E.3** (0.5 pt)**E.4** (1.5 pt)

$$v_\infty =$$