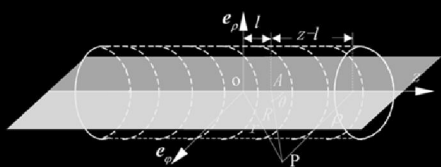
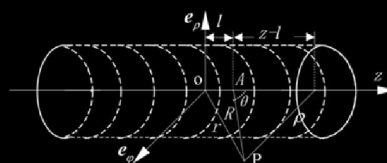


2014级计算机学院 赵宏祝

# 使用C++绘制由平面上通电螺线管组成系统的磁力线



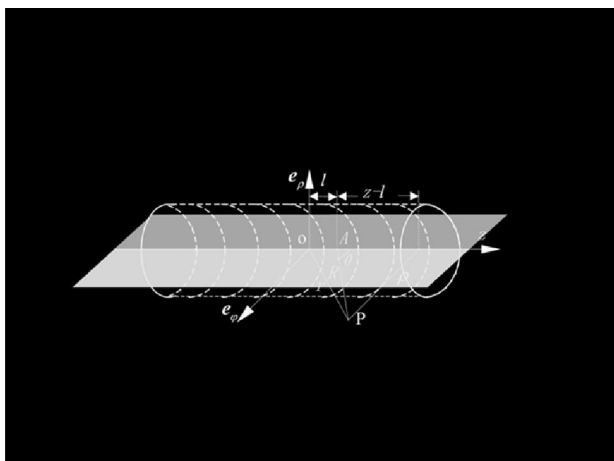
## 磁 矢 势

Magnetic Vector Potential

$$A$$

$$B = \nabla \times A$$

磁场是磁矢势的旋度

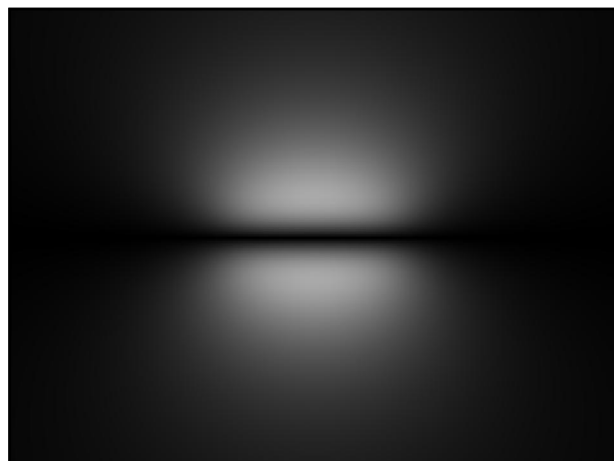


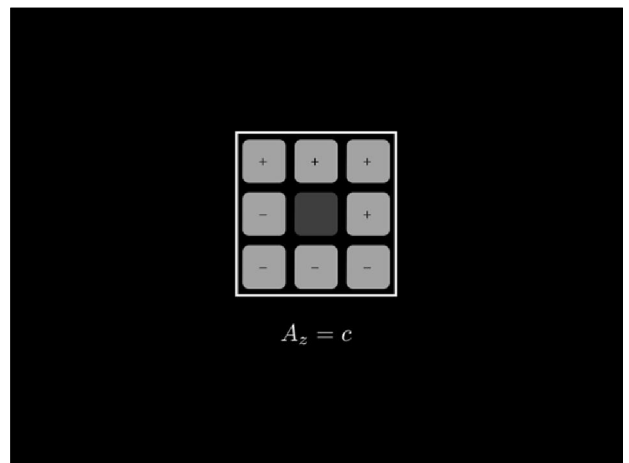
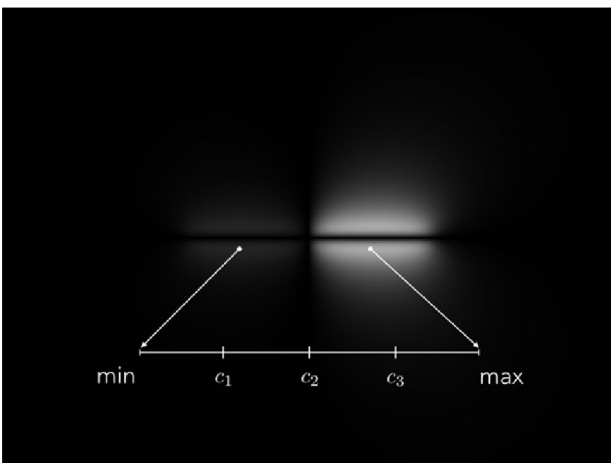
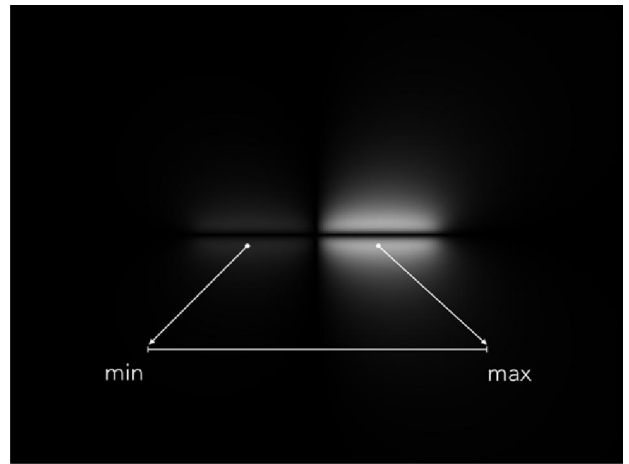
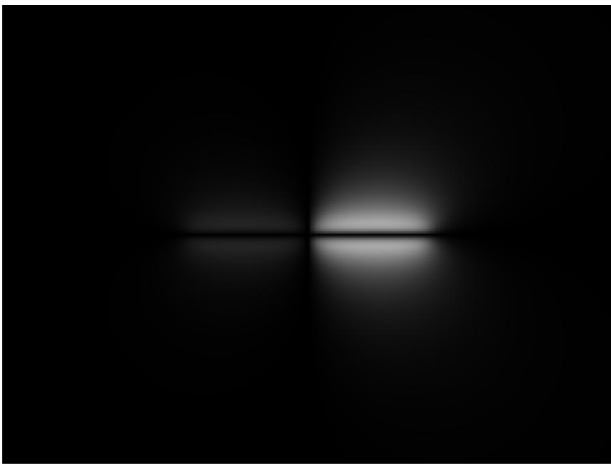
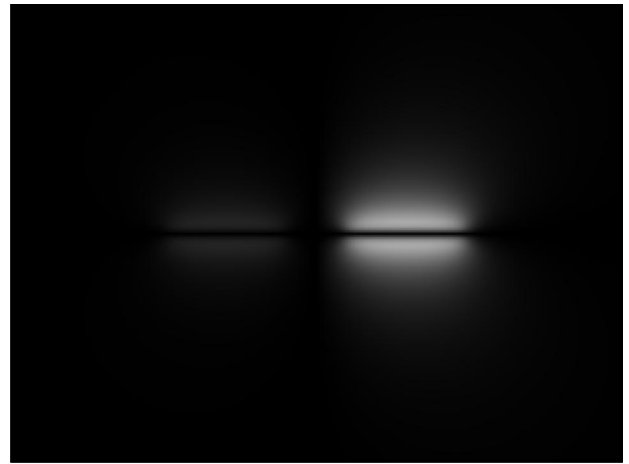
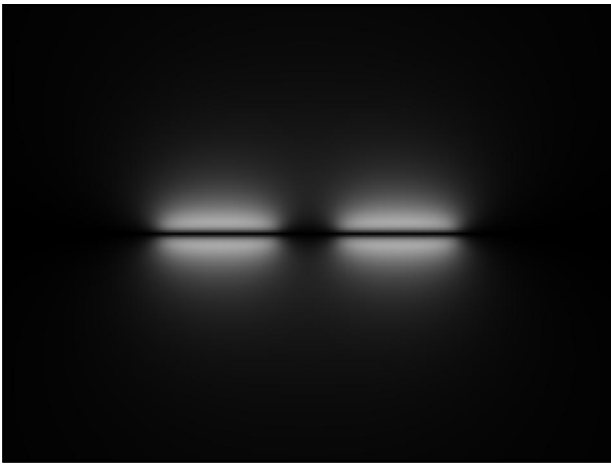
$A_z = c$   
 一条磁力线上的点满足

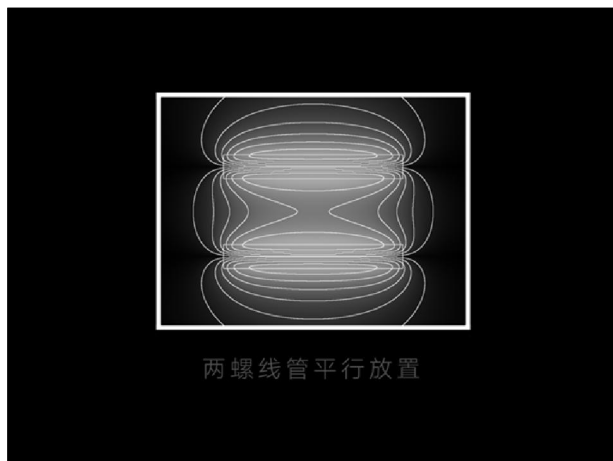
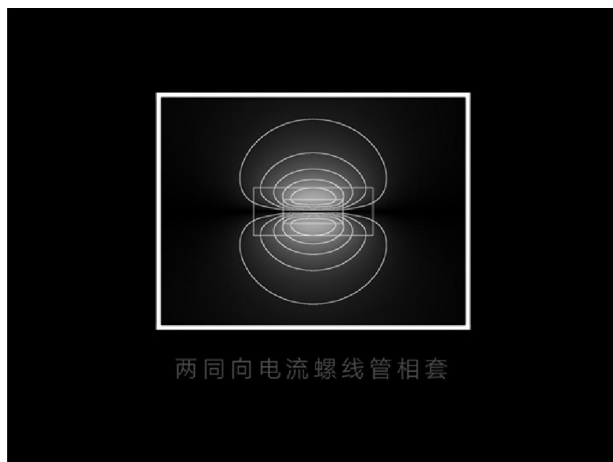
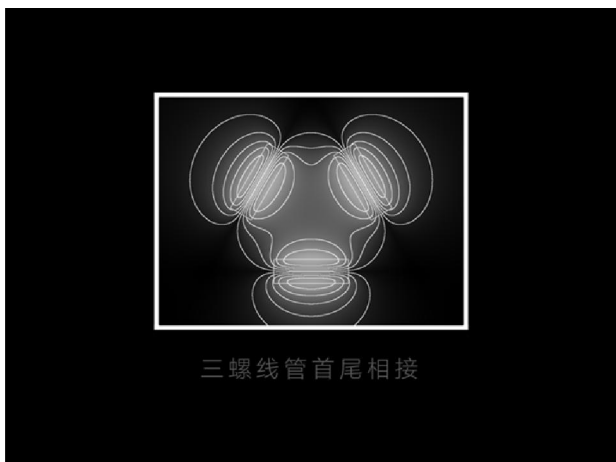
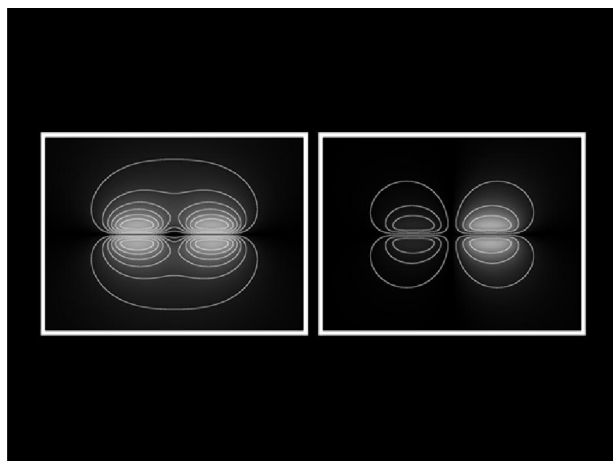
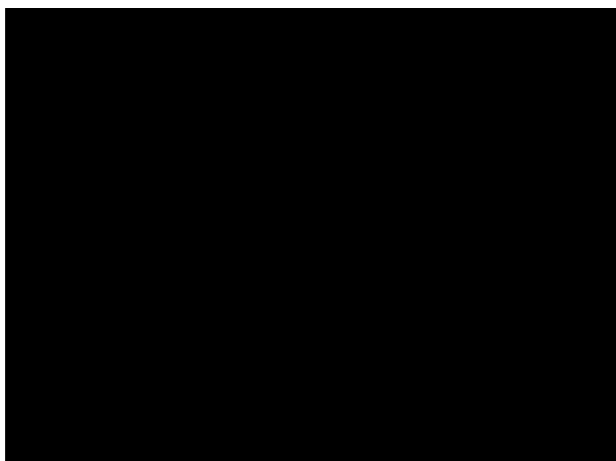
$$A = -\frac{\mu_0}{4\pi} \frac{I a^2 R \sin\theta}{(a^2 + z^2)^{3/2}} e_\phi$$

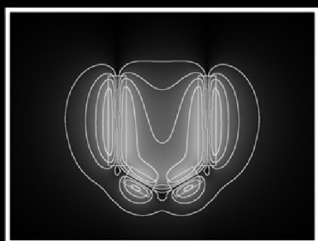
$$A = \int_{\theta_1}^{\theta_2} -\frac{\mu_0}{4\pi} \frac{n I a^2 \rho^2}{(a^2 + \frac{\rho^2}{\sin^2\theta})^{3/2} \sin^2\theta} d\theta$$

libpng  
 The official PNG library









螺线管冒充蹄形磁铁

#### REFERENCE

- [1] 苏安, 顾国锋. 对求解通电螺线管磁场两种方法的讨论 [J]. 广西物理, 2008, (1). 51~54.
- [2] 黄学良, 胡敏强, 杜炎森. 工程电磁场计算中磁力线绘制问题的研究 [J]. 大电机技术, 1995, (6). 25~29.