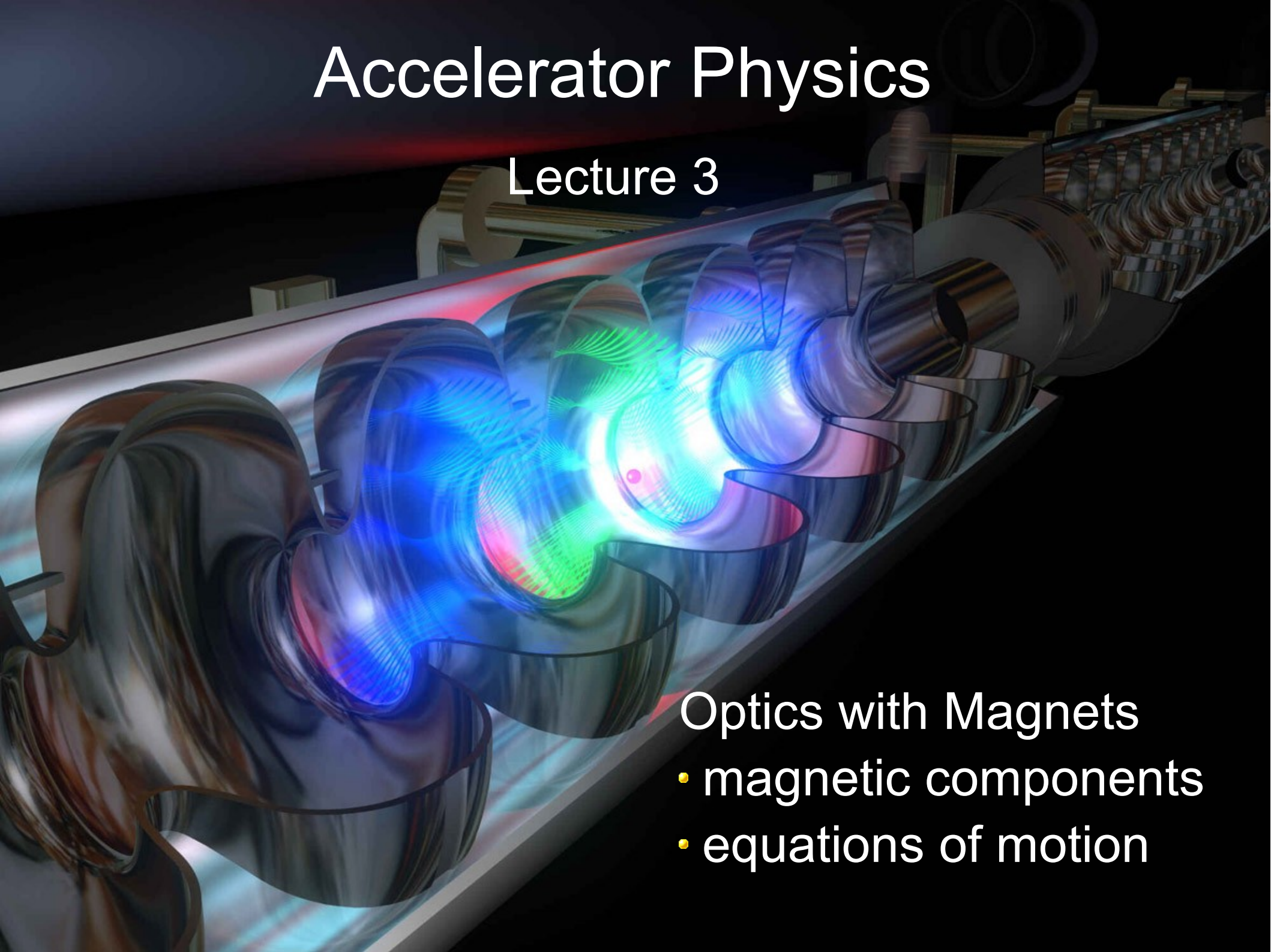


Accelerator Physics

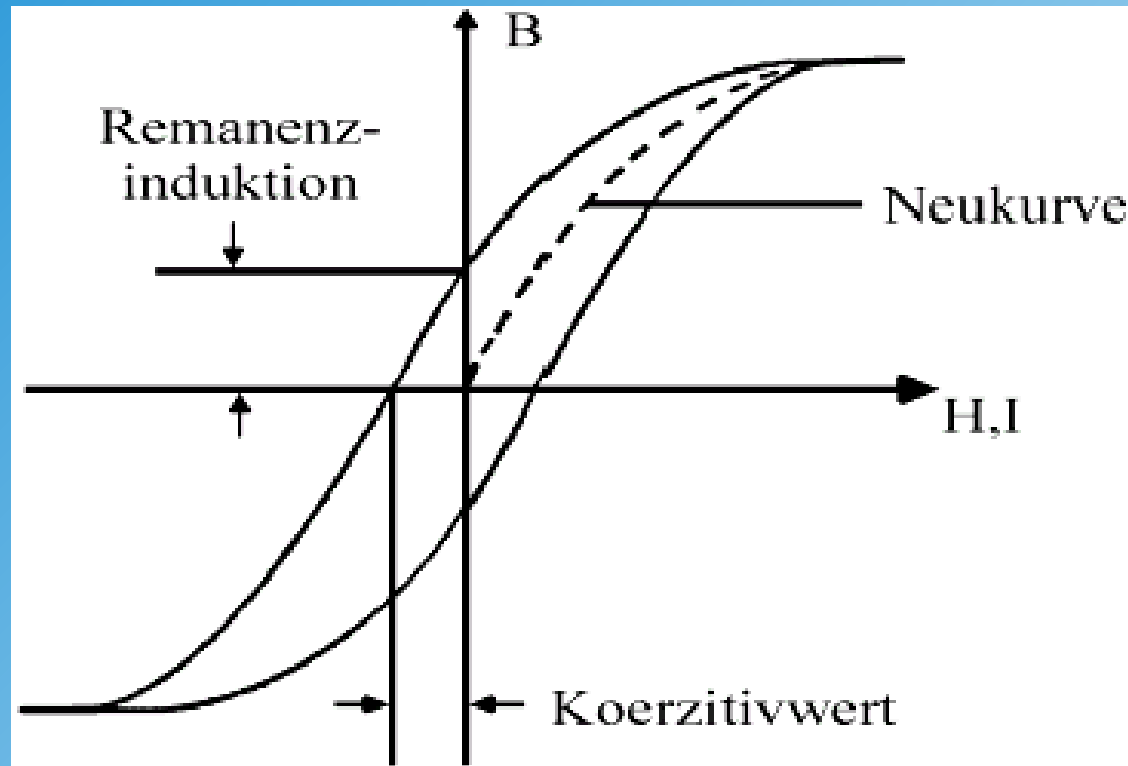
Lecture 3



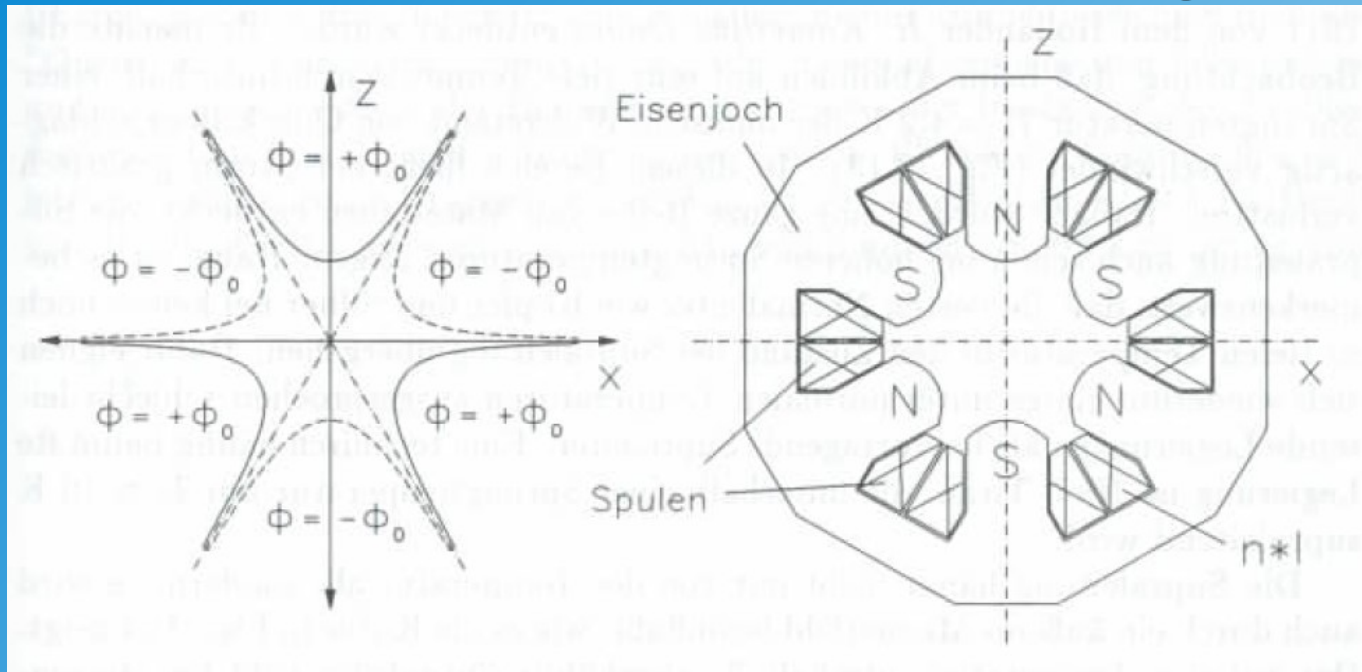
Optics with Magnets

- magnetic components
- equations of motion

Magnetic Hysteresis



Sextupole Magnet

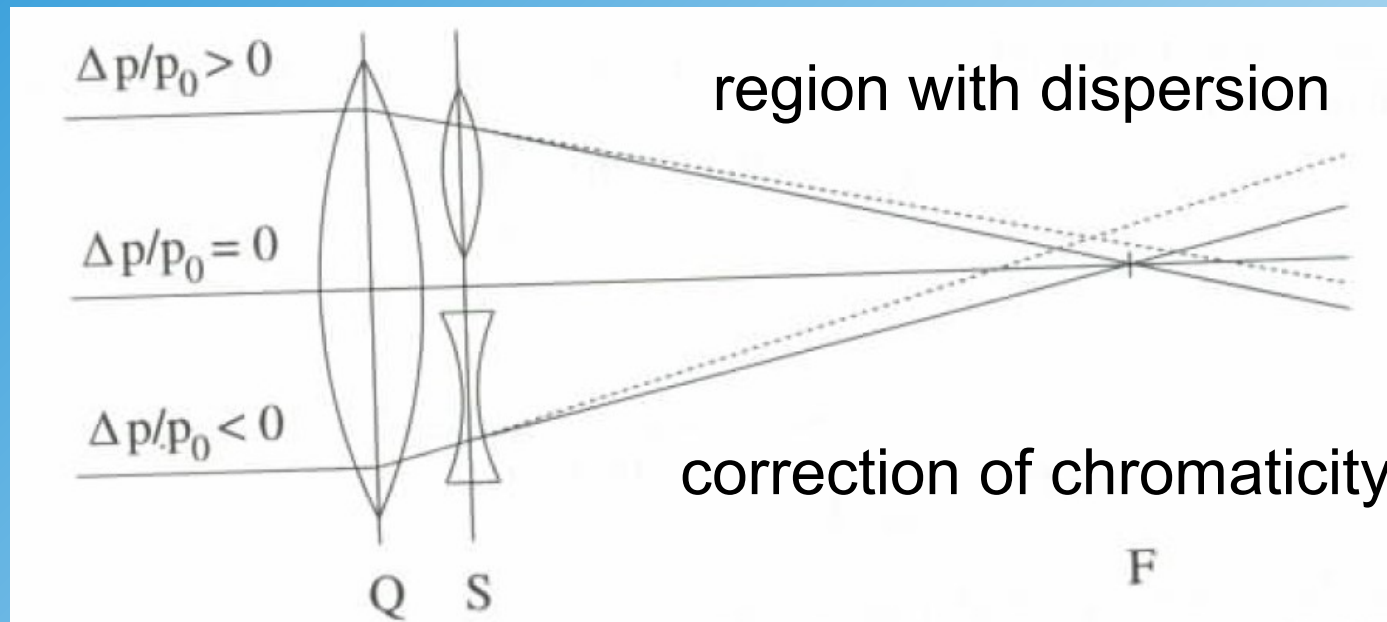


$$\Phi = -\frac{g_s}{2} \left(x^2 y - \frac{y^3}{3} \right)$$

$$B_x = g_s xy$$

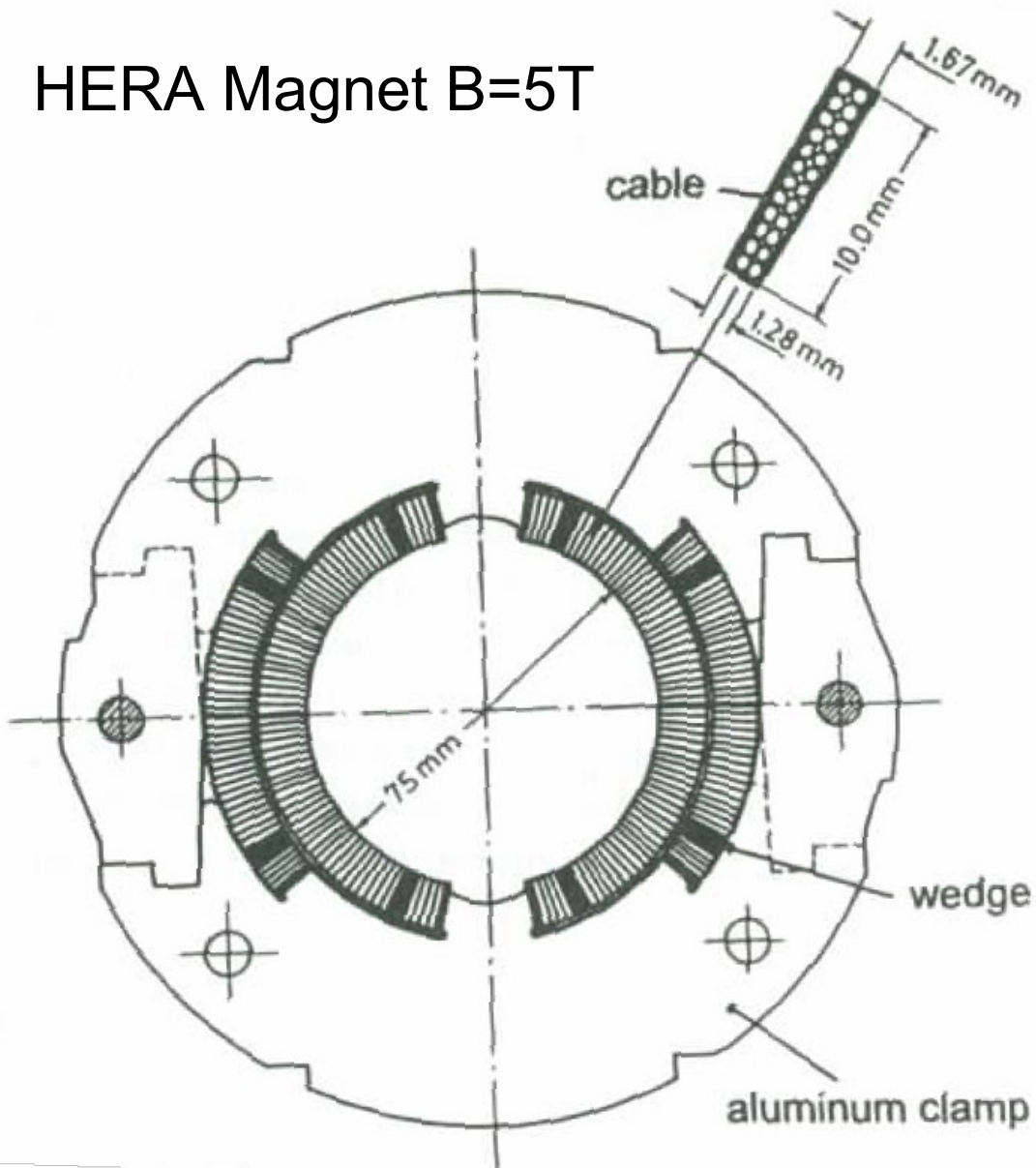
$$B_y = \frac{1}{2} g_s (x^2 - y^2)$$

$$g_s = 6\mu_0 \frac{nI}{a^3}$$



Superconducting Magnet

HERA Magnet $B=5T$



14 μm Niob titanium wires ($<4K$) embedded in copper matrix

\sim factor 5 stronger fields with SC

Standard Coordinate System

