

Television

Question:

A television image is created by beams of moving electrons that collide with the inside front surface of the television picture tube and cause it to glow. Will a magnet held still near the picture tube affect the image that forms?

Observations About Television

- Radio waves carry an image somehow
- Image can be black & white or color
- Television takes a moment to turn on or off
- Image is affected by magnetic fields
- Photographs of televisions look funny

Creating an Image

- A television creates its image dot by dot
- It scans the screen 60 times per second
- A full frame is two scans – two fields
- Our eyes are slow; we see continuous motion

Fluorescence

- Electrons collide with phosphors inside screen
- Phosphors are electronically excited
- Phosphors emit their excess energy as light
- Different phosphors emit different colors

Aiming the Electrons

- Electrons are “boiled” off a hot wire
- They’re accelerated toward positive charge
- They’re focused and steered *en route* to screen
 - Focusing is electric and magnetic
 - Steering is magnetic

Image Creation

- Electron beam intensity variations are synchronized with the beam scanning
- Patterns of dark and light create images
- TV station provides the intensity information

Color Television

- Three colors all that's required for color TV
 - Red, Green, and Blue are primary colors of light
 - Combining these can make us see any color
- Color television has three phosphors: RGB
- 3 electron beams illuminate those 3 phosphors
- Shadow mask aids in hitting correct phosphor

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Digital Television

- Analog TV transmits every dot via radio wave
- Digital television encodes the image
 - Digitize image into a pattern of colored pixels
 - Compress out redundant, non-essential information
 - Transmit digital, compressed info via radio wave
- Digital offers noise-free, high resolution TV

Near Future of TV

- Dual Transmissions: Analog & Digital
- Phase-out of Analog TV (set top converters)
- Flat-panel TV sets (LCD and Plasma)
- VCR replaced by DVD and Digital Recorders