Physics Spots Pneumonia and Other Medical Applications

Modern medical equipment is based on important physical laws

### Imaging

Imaging technology uses advanced physics

Doctors often need to see inside the body

3 approaches:
- Exploratory surgery
- Endoscopy
- Imaging

### X-ray imaging

- X-ray imaging is similar to digital photography
- X-ray imaging relies on transmission rather than reflection

### Magnetic resonance imaging (MRI)

### Ultrasound imaging

### Nuclear medicine imaging

### Radiotherapy

- Radiotherapy is for treating cancer
- Cancer is one of the leading causes of death

### Cancer treatment options

- Surgery
- Chemotherapy
- Radiotherapy

### Symptoms of coronavirus disease 2019 (COVID-19):

- Pneumonia
  - Fever
  - Cough
  - Shortness of breath

- Chest x-ray for pneumonia
- Pneumonia results from fluid accumulation in lungs
- Fluid absorbs x-rays more than air
- Opaque areas on chest x-ray and CTs

Modern radiotherapy mostly performed by linear accelerators (LINAC).

Multiple beams focus radiation on tumor

Careful planning is required, often aided by computer simulations and phantoms