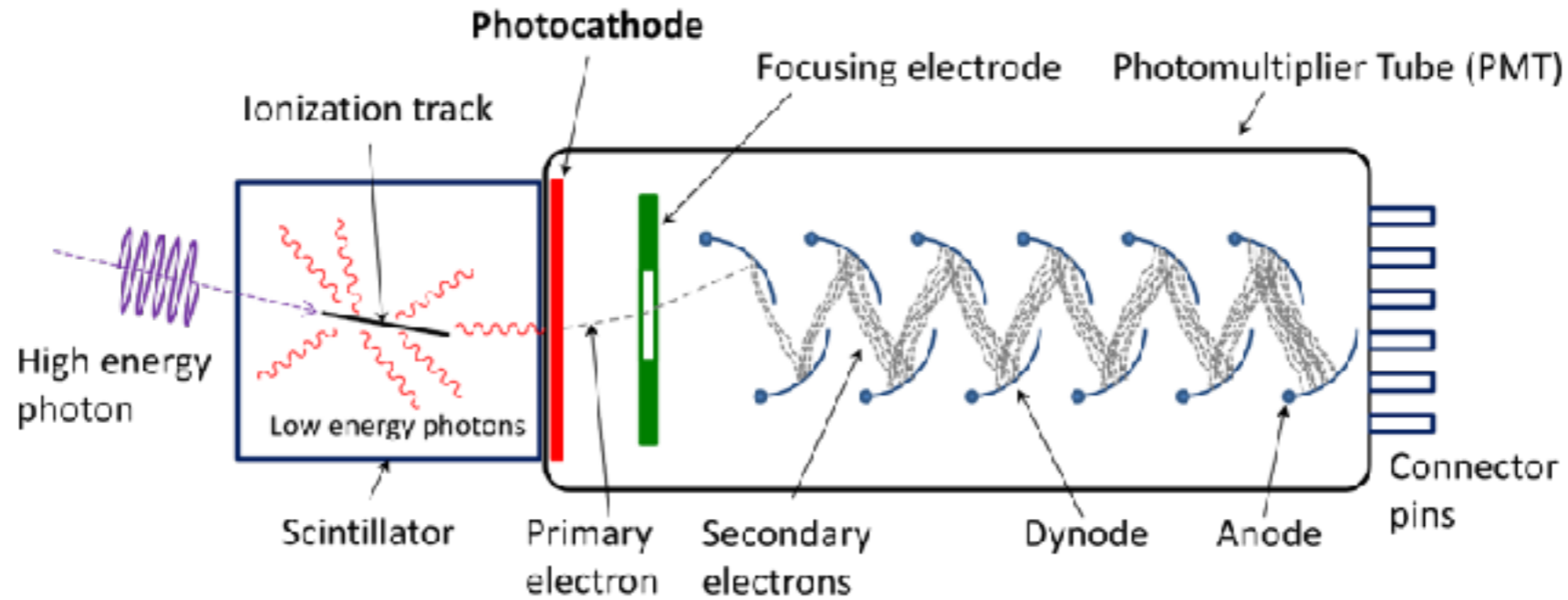


# Organic Scintillator

180308

# Scintillation Counter

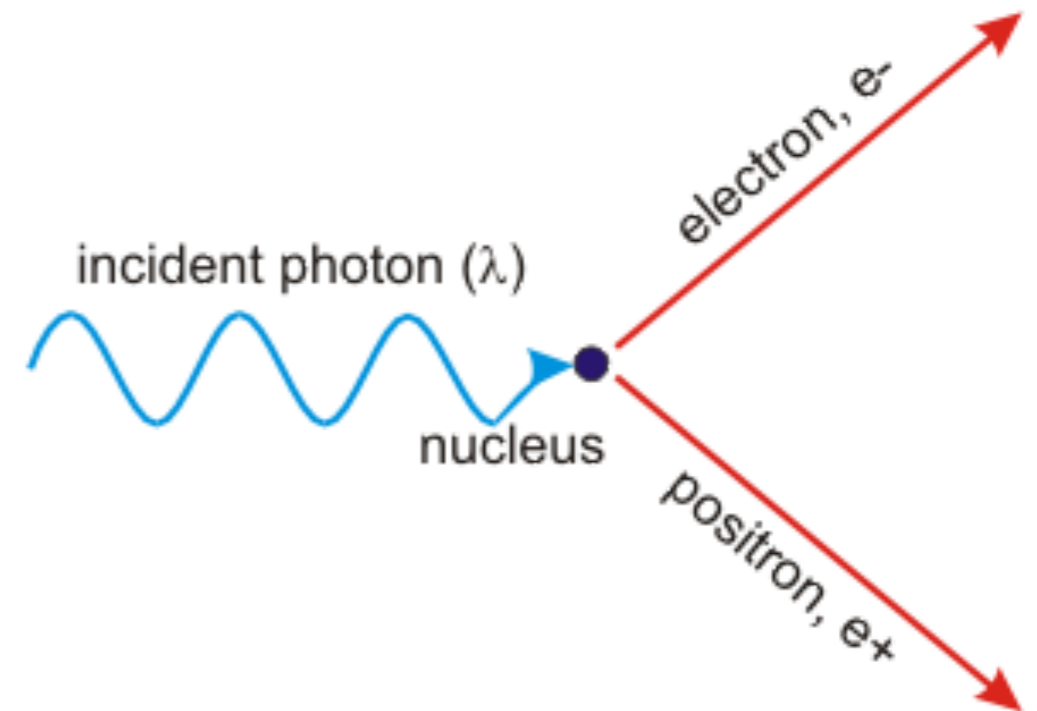
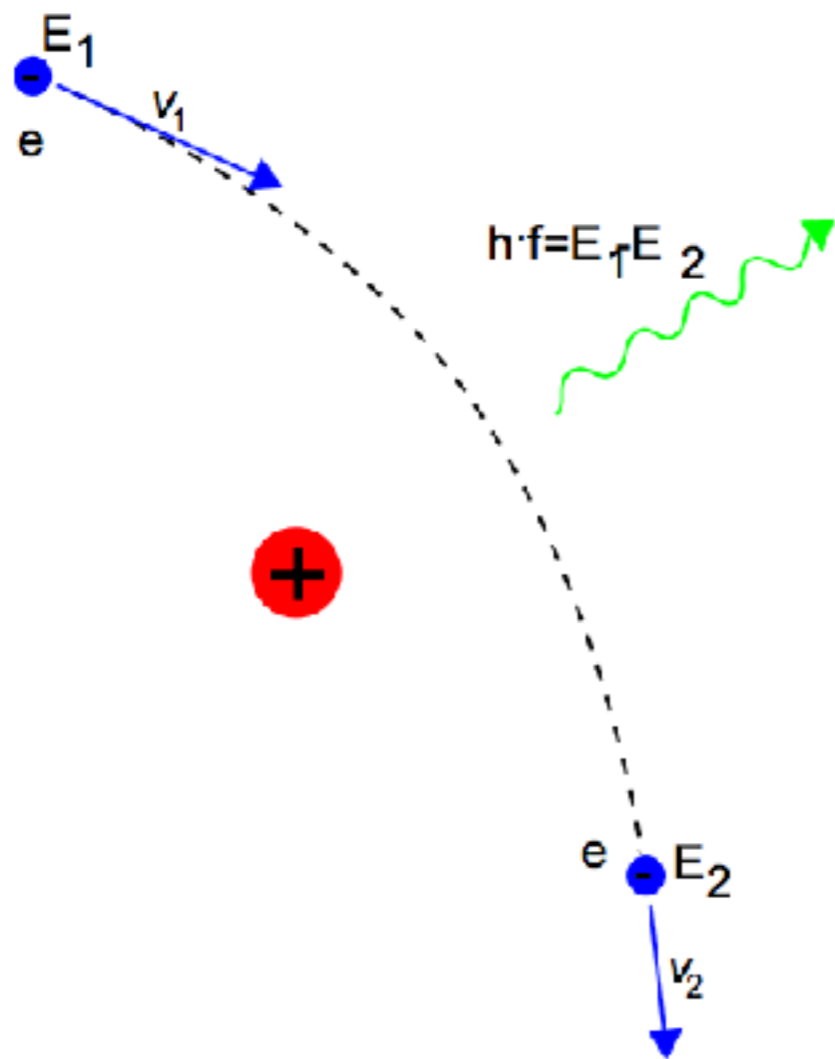


**Sensitivity to Energy**

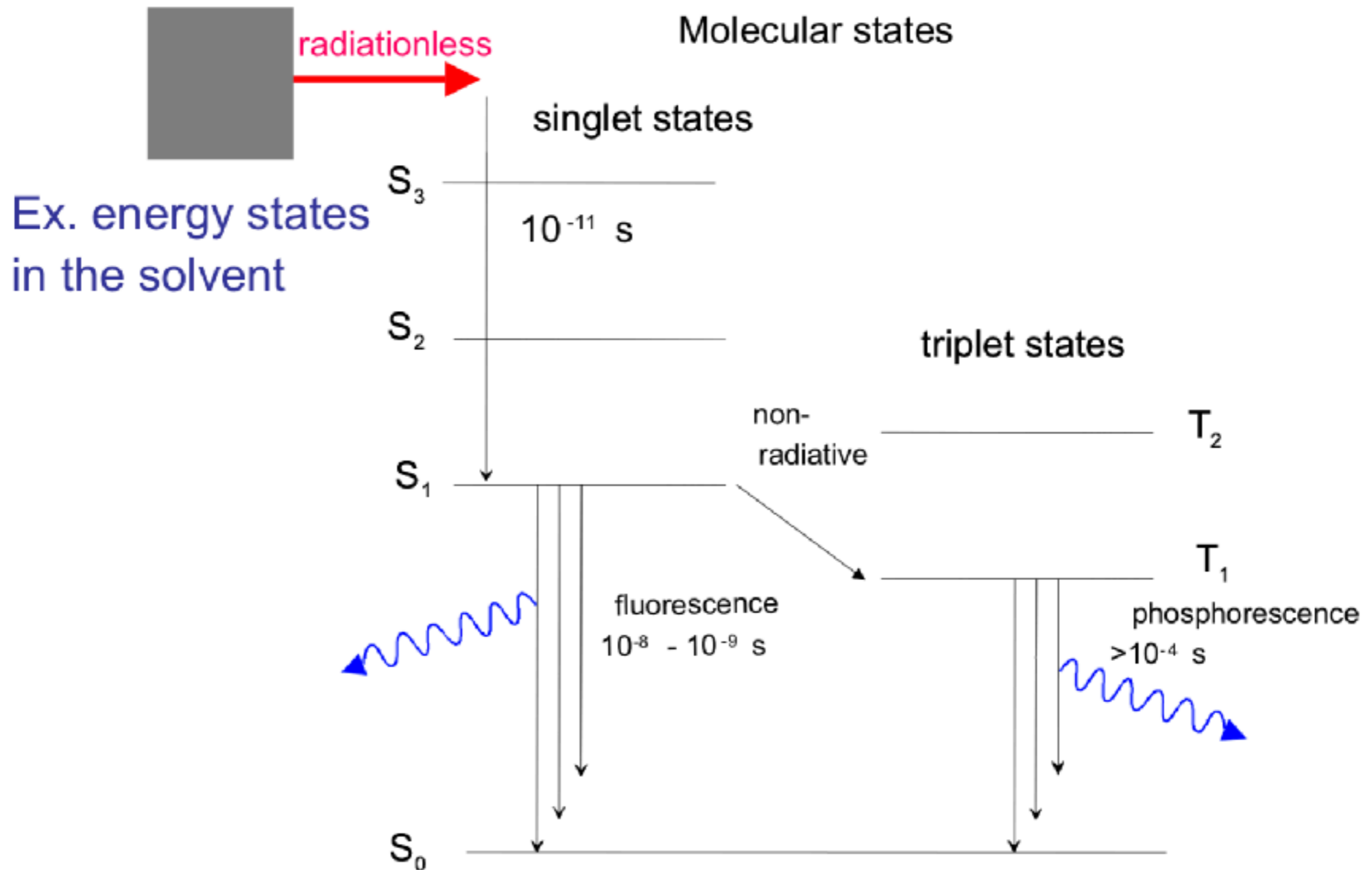
**Fast Time Response**

**Pulse Shape Discrimination**

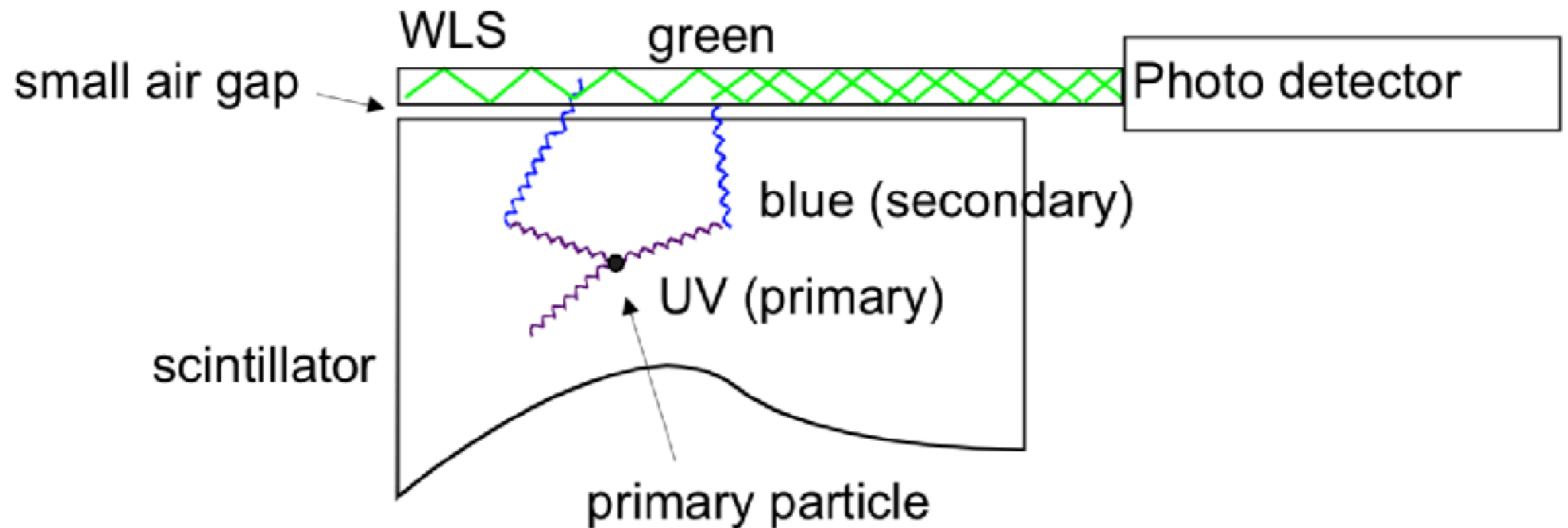
# Bremsstrahlung and Pair production at very high energies



# Scintillation Mechanism



# Wavelength Shifter



- attenuation length

# Organic Scintillator

- The organic scintillators are aromatic hydrocarbon compounds containing linked or condensed benzene-ring structures.
  - Organic Crystals
  - Organic Liquids
  - Plastics(more flexible)

# Organic or Inorganic

## Organic Scintillators

→ cheap

### Advantages

- very fast
- easily shaped
- small temperature dependence

### Disadvantages

- lower light yield [typical  $\epsilon \sim 0.03$ ]
- radiation damage

## Inorganic Scintillators

→ expensive

### Advantages

- high light yield [typical  $\epsilon \sim 0.13$ ]
- high density [e.g. PWO  $\sim 8.3 \text{ g/cm}^3$ ]
- good energy resolution

### Disadvantages

- complicated crystal growth
- large temperature dependence

# Reference

- Particle Detectors at Accelerators (PDG 2017)
- Passage of particles through matter(PDG 2017)
- A short Overview on Scintillators by C. D'Ambrosio(CERN)
- Techniques for Nuclear and Particle Physics Experiments(William R. Leo)
- Barrel Charged Veto Detector for  $K_L^0 \rightarrow \pi^0 \nu \bar{\nu}$  Experiment at KEK-E391a(이효상)