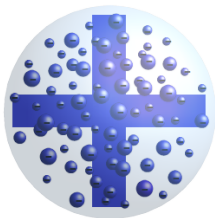


# Rutherford Scattering Detection through Gold Foil

Henry Shackleton

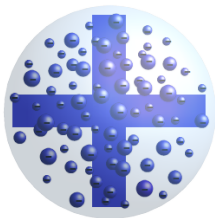
April 24, 2017

# Plum Pudding and Rutherford Model



**Plum Pudding Model**

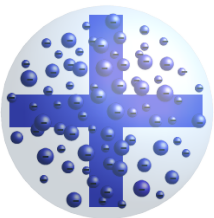
# Plum Pudding and Rutherford Model



## Plum Pudding Model

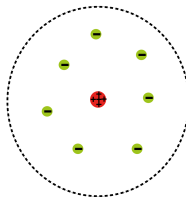
- Small electrons in a "soup" of positive charge

# Plum Pudding and Rutherford Model



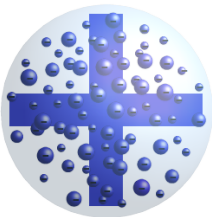
**Plum Pudding Model**

- Small electrons in a "soup" of positive charge
- Produces small-angle scattering that dies off exponentially



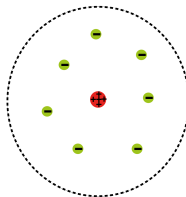
**Rutherford Model**

# Plum Pudding and Rutherford Model



## Plum Pudding Model

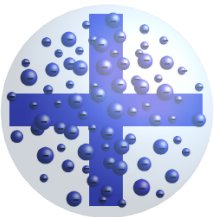
- Small electrons in a "soup" of positive charge
- Produces small-angle scattering that dies off exponentially



## Rutherford Model

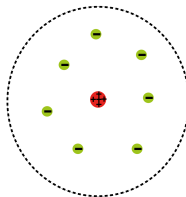
- Electrons orbit around a concentrated positive charge

# Plum Pudding and Rutherford Model



## Plum Pudding Model

- Small electrons in a "soup" of positive charge
- Produces small-angle scattering that dies off exponentially



## Rutherford Model

- Electrons orbit around a concentrated positive charge
- Allows for large scattering angles

# Rutherford Scattering Derives from Coulumb Interactions

$$\frac{d\sigma}{d\Omega} = \left( \frac{ZZ'e^2}{4E} \right)^2 \frac{1}{\sin^4(\theta/2)}$$

- Differential cross section describes probability of scattering at angle  $\theta$ .
- Translation to observable trends requires consideration of flux, area density, etc., but does not affect  $\theta$ -dependence.
- Evaluating  $\theta$ -dependence

# Apparatus allows for scattering detection at various angles

