

## Homework 5 (20 points)

1. Calculate the differential cross section  $\frac{d\sigma}{dt}$  of the

$e + \mu \rightarrow e' + \mu'$  reaction in

(a) ultrarelativistic case in which all masses are neglected.

(b) in the limit in which mass of the electron is neglected while mass of  $\mu$  is taken to infinity.

2. Calculate the differential cross section  $\frac{d\sigma}{dt}$  of the

$e + e \rightarrow e' + e'$  reaction in the ultrarelativistic limit.

3. Calculate the differential cross section  $\frac{d\sigma}{dt}$  of the

$e^- + e^+ \rightarrow \mu^- + \mu^+$  reaction in the ultrarelativistic limit.

4. Calculate the differential cross section  $\frac{d\sigma}{dt}$  of the Compton

scattering

$\gamma + e \rightarrow \gamma' + e'$