

EXERCISES" INTERACTION OF RADIATION AND PARTICLES WITH MATTER"

TBILISI AUTUMN LECTURES OCTOBER 2015

1. *Derive the nonrelativistic relation between kinetic energy and momentum from the relativistic energy-momentum relation.*
2. *By which process charged particles loose kinetic energy in matter?*
3. *Which process dominates – depending on the energy of the radiation – the attenuation in matter?*
4. *Which processes are involved in an X-ray session at your medical doctor having an apparatus labeled 25 keV?*
5. *Which is the minimum velocity (in units of speed of light c) for particles in order to produce Cerenkov light in plastic material with index of refraction $n = 1.5$?*
6. *The maximum absorbance of the medium wavelength cone cells in the human eye is reached at 534nm (green), where the maximum of the sun's emission spectrum at sea level is 550 nm. What is the energy of the corresponding photon?*