

## Exercise sheet IV: Cosmic Rays

Jose A. R. Cembranos \*

*Departamento de Física Teórica I, Universidad Complutense de Madrid, E-28040 Madrid, Spain.*

IV.a.- Compute the minimum energy for a photon in the rest frame of the CMB for producing a  $e^+e^-$  pair by scattering with a photon of the CMB.

---

\* Electronic address: [cembra@fis.ucm.es](mailto:cembra@fis.ucm.es)