Teilchenphysik II (Higgs-Physik) (SS 2016)

Institut für Experimentelle Teilchenphysik

Dr. R. Wolf, Dr. S. Wayand

Exercises Sheet 01

http://www-ekp.physik.uni-karlsruhe.de/~quast/ Release: Thur, 21.04.2016

Exercise 1: Natural Units (presence)

Complete the following list of natural units:

$$[m] = \text{GeV} \qquad [\,x\,] =$$
$$[E\,] = \text{GeV} \qquad [\,t\;\,] =$$
$$[\,p\,] = \text{GeV} \qquad [\partial_\mu] =$$

Exercise 2: Lorentz Scalars and Vectors (presence)

Complete the list of the following physical objects classified by their behavior under *Lorentz* transformations:

- *Lorentz*-Scalar:
- *Lorentz*-Vector:
- *Lorentz*-Tensor (2. order):
- *Lorentz*-Spinor: $\Lambda: \;\; \psi^\alpha(x^\mu) \rightarrow \psi'^\alpha(x'^\mu) = S^\alpha_\beta \psi^\beta(\Lambda^\mu_\nu x^\nu).$

Find and example and note its transformation behavior.