

Exercises, part 2

Thursday 2003-10-23 - Thursday 2003-10-30 16:00

**1. W discovery**

10 points

Read the paper

G. Arnison et al (UA1 collaboration), Phys. Lett. B 122 (1983) 103, 'Experimental Observation of Isolated Large Transverse Energy Electrons with Associated Missing Energy at  $\sqrt{s} = 540$  GeV'

Please answer the following questions:

- a) Where does the  $M_W$  prediction of  $82 \pm 2.4$  GeV come from ?
- b) Which is the maximum  $\eta$  value covered by the forward calorimeters ?
- c) What can be learned about the W cross section from these UA1 data ?
- d) Summarize the electron identification criteria.
- e) Summarize the neutrino identification criteria.
- f) Where does the peak in fig.7, bottom right, come from ?
- g) How many W bosons have been produced in total during the data taking period of 30 days ? How long would it take at the LHC (nominal luminosity) to produce the same amount ?
- h) Which are the background processes considered here ? Can you think of other backgrounds ?
- i,j) Ask yourself two questions related to the paper!