Information for the 2019-20 session SPA6309 Resit

Assignment

This is the same in principle as the one you attempted earlier this year. The instructions and indicative marking scheme are unchanged. The topic is to explain how the Z0 boson is reconstructed from its decays to lepton pairs.

This time you will write about the relevant sub-detectors, and how they are used in combination, of the experiment D0 (DZero) which was an experiment operating at the Fermilab "Tevatron" proton-antiproton collider[1]. Unlike the early operation of LEP, where the total cms collision energy was designed to be at or very close to the Z0 mass peak, here we are colliding quarks/anti-quarks and gluons which are the constituents of the proton (and its anti-particle) at proton/anti-proton beam energies much higher than the Z0 mass.

Quite often Z0 bosons (and many other particles) were produced in collisions at the Tevatron and in this assignment I am asking you to discuss how the Z0 boson was reconstructed from its decay into *either* an electron/positron pair *or* from its decay into a muon/anti-muon pair using relevant detector subsystems.

Individual allocation

I have allocated the decay channel of the Z0 boson to each of you individually in this table.

First name	Surname	Z0 decay channel
Maitha	**Ahmad**	electrons
Usama	**Aldeen**	muons
Luke Andrew Thomas	**Dadford**	electrons
Mayssa	**Jamil**	muons
Peiyi	**Lin**	electrons
Zizhen	**Lin**	muons
Yusra Yusuf	**Luhar**	electrons
Sarah Louise	**Neville**	muons
Sameer	**Omer-Jin**	electrons
Pritpal Singh	**Rehal**	muons
Mohammed Abu Bokkar	**Arif**	electrons
Federico	**Giovannini**	muons
Abbie	**Mace**	electrons
Aubrey	**McKinnon**	muons
Safiya	**Merali**	electrons
Pierre	**Nikititis**	muons

[1] See for example https://www.fnal.gov/pub/tevatron/index.html

Submission information

An individual report consisting of one cover page and then up to **eight sides A4 maximum**, including figures & references, and typed using a 12-point font (can be 10 point for the figure captions and the references if you wish).

Absolute Submission Deadline: Friday 28th August, 12PM (MIDDAY)