Chapter 4

Electromagnetic Calorimeter

4.1 Description of the ECAL

In this section, the layout, the crystals and the photodetectors of the Electromagnetic Calorimeter (ECAL) are described. The section ends with a description of the preshower detector which sits in front of the endcap crystals. Two important changes have occurred to the geometry and configuration since the ECAL TDR [5]. In the endcap the basic mechanical unit, the "supercrystal," which was originally envisaged to hold 6×6 crystals, is now a 5×5 unit. The lateral dimensions of the endcap crystals have been increased such that the supercrystal remains little changed in size. This choice took advantage of the crystal producer's ability to produce larger crystals, to reduce the channel count. Secondly, the option of a barrel preshower detector, envisaged for high-luminosity running only, has been dropped. This simplification allows more space to the tracker, but requires that the longitudinal vertices of $H \rightarrow \gamma\gamma$ events be found with the reconstructed charged particle tracks in the event.

4.1.1 The ECAL layout and geometry

The nominal geometry of the ECAL (the engineering specification) is simulated in detail in the GEANT4/OSCAR model. There are 36 identical supermodules, 18 in each half barrel, each covering 20° in ϕ. The barrel is closed at each end by an endcap. In front of most of the fiducial region of each endcap is a preshower device. Figure 4.1 shows a transverse section through ECAL.

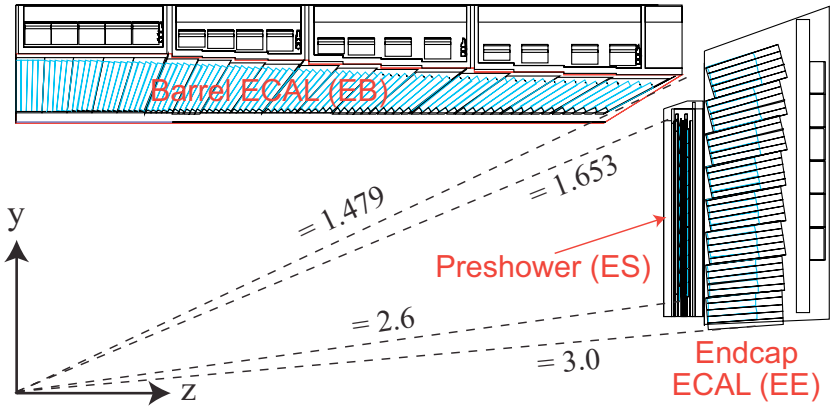

Figure 4.1: Transverse section through the ECAL, showing geometrical configuration.