When a non-irradiated sensor is operated at voltages above the full depletion voltage, all the deposited charge will be collected. This explains the constant amount of charge collected when the sensors are fully depleted ($V_{bias} > 40$ V for S23 and $V_{bias} > 140$ V for S6). The path traversed by the particle in each pixel when the sensor is tilted at $85^\circ$ with respect to the beam is 55.2 µm, which is almost equal to the pixel pitch. A minimum ionizing particle is expected to create about 72 $e^-$/hole pairs per µm [39], therefore the most probable charge deposited in each pixel is $3960$ $e^-$. When the sensors are fully depleted, the amount of measure charge is $3850 \pm 100$ $e^-$. The amount of charge collected from the first and the last pixel is lower because the path traversed by the particle in those edge pixels is smaller compared to a center pixel.

In case of the Micron sensor (Figure 8.12(a)) the amount of charge collected at 20 V bias is constant up to about 140 µm. Beyond that depth the amount of charge collected drops almost linearly. The same effect occurs in the case of the Hamamatsu sensor (Figure 8.12(b)) but at a higher voltage. At bias voltages lower than the full depletion voltage, the amount of charge collected decreases up to a point where the charge is equal to about 1500 $e^-$. Although the threshold is set at 1000 $e^-$, the collected charge does not reach that value. This is due to the timewalk effect as will be discussed in Section 8.7.4.

The amount of charge collected saturates for about 10 µm when it reaches the minimum. The fit and the threshold value of 1000 $e^-$ at those depth bins is biased due to the low number of statistics. As can be seen in the statistics plot of S6 at 20 V in Figure 8.13, for depths beyond 100 µm (where the saturation occurs) the number of events is less than half compared to the maximum number of events. This low number of statistics will pull the Landau