A Note on Luminosity

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In this note, two problems in yuancz's program and kumac file respectively, which are used to calculate luminosity, are pointed out.

According to yuancz's idea, the selection efficiency is determined by data sample instead of Monte Carlo simulation data. So one must have a Bhabha events sample by using dE/dx information, then one selects Bhabha event out by using SC information from the sample. During one uses SC information, one must find out two cluster with maximum energy firstly. But in yuancz's program, author didn't follow this rule strictly, and he took a idea: The charge tracks are the two cluster with maxium energy, which sounds reasonable in physics. But this idea doesn't work well in the case of hard photon emission. In order to find out two maximum deposit energy in BSC, I add a module which is a copy of subroutine LUMCAL.

By scanning events, we found a small amount of 2 gamma events are selected in sample. From Fig. 1, we can find that one gamma turnes into electron and position, and the difference of phi angle ($\delta\phi$) for electron and position are small in 2 gamma events. But in Bhabha event, the $\delta\phi$ are more larger (Fig. 2) So in the modified kumac file, the $\delta\phi$ is used as a cut for two charged track. Also, we show the relationship of luminosity and the $\delta\phi$ in Fig. 3, and we think the 0.5π is a sitable cut value. The result of scanning event also suport this value.

When one counts the event of signal and background in sample, one must combine the cut for sample with the cut for signal/background. But in yuancz's kumac file, the angle cut for sample was forgot. One can find out this problem by comparing cut 49 with cut 50.

Table and Figure Captions

Fig. 1 A two gamma event selected as a sample event (Without $\delta\phi$ cut)

Fig. 2 A Bhabha event (With a hard photon)

Fig. 3 Lum. vs the $\delta\phi$ at 3.0 GeV

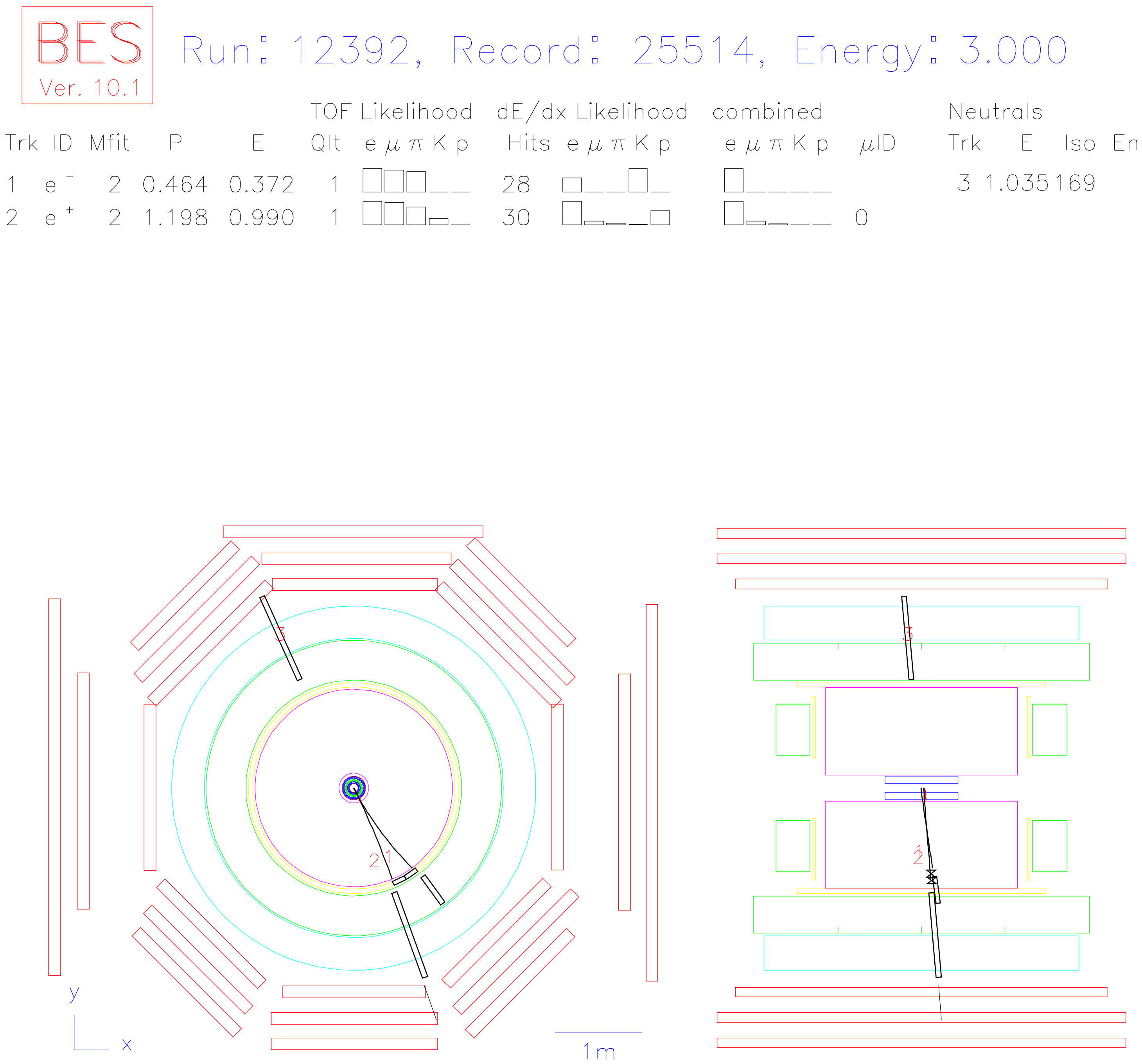

Figure 1: The two gamma event

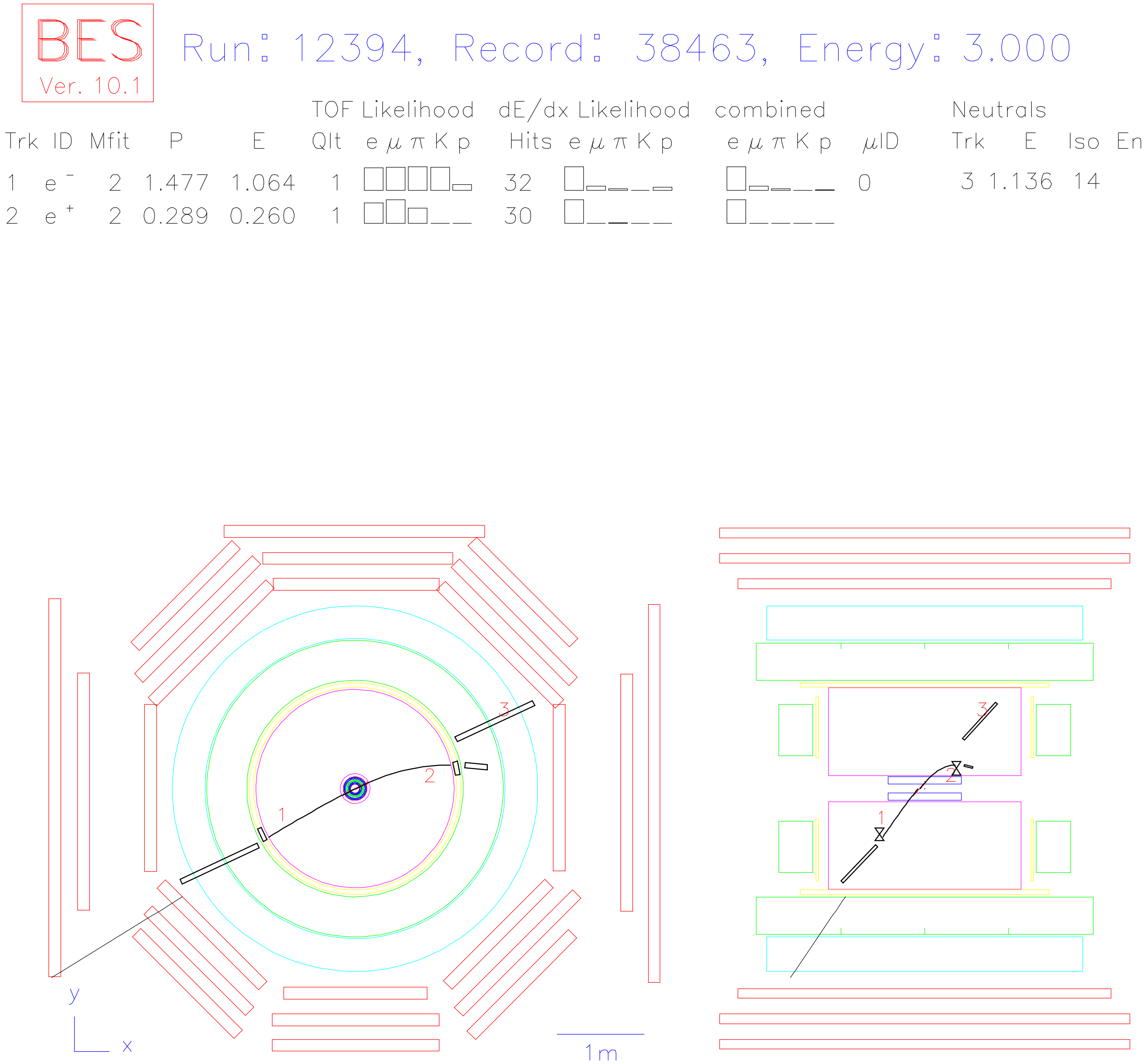

Figure 2: The Bhabha event with a hard photon

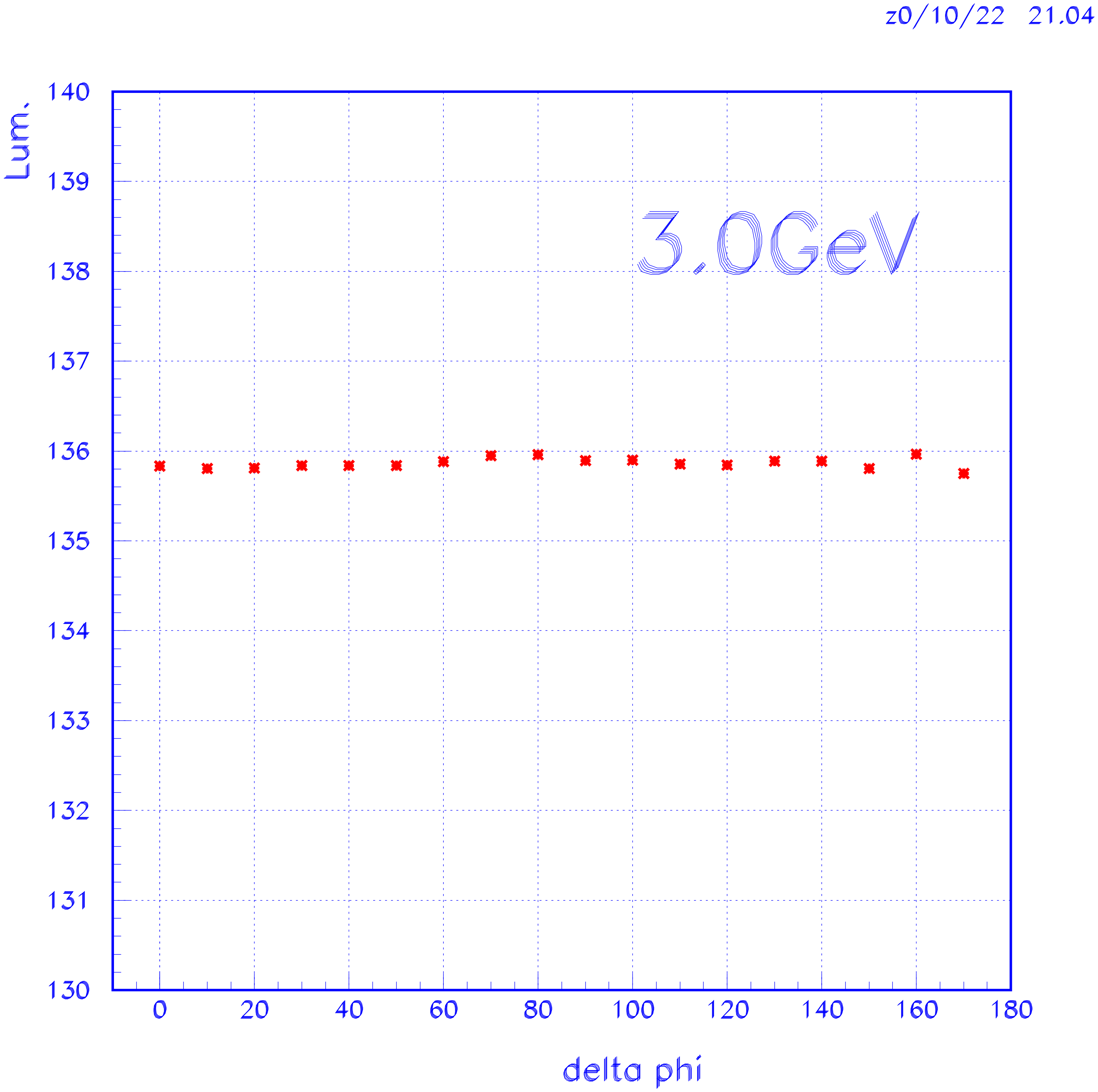

Figure 3: Lum. vs the $\delta\phi$ at 3.0 GeV