Event Mixing

- general considerations
- event mixing method used in WA98 analysis
- normalisation of the event mixing background
- results

Desrcibed in detail in the PhD thesis of C. Blume (german lang. :-( )

General considerations

- π^0 reconstructed by calculating the invariant mass distribution of photon/hit pairs

- in central events the large number of hits leds to a huge combinatorial background

- calculation of the inv. mass from uncorrelated hits taken from different events used to estimate the combinatorial background

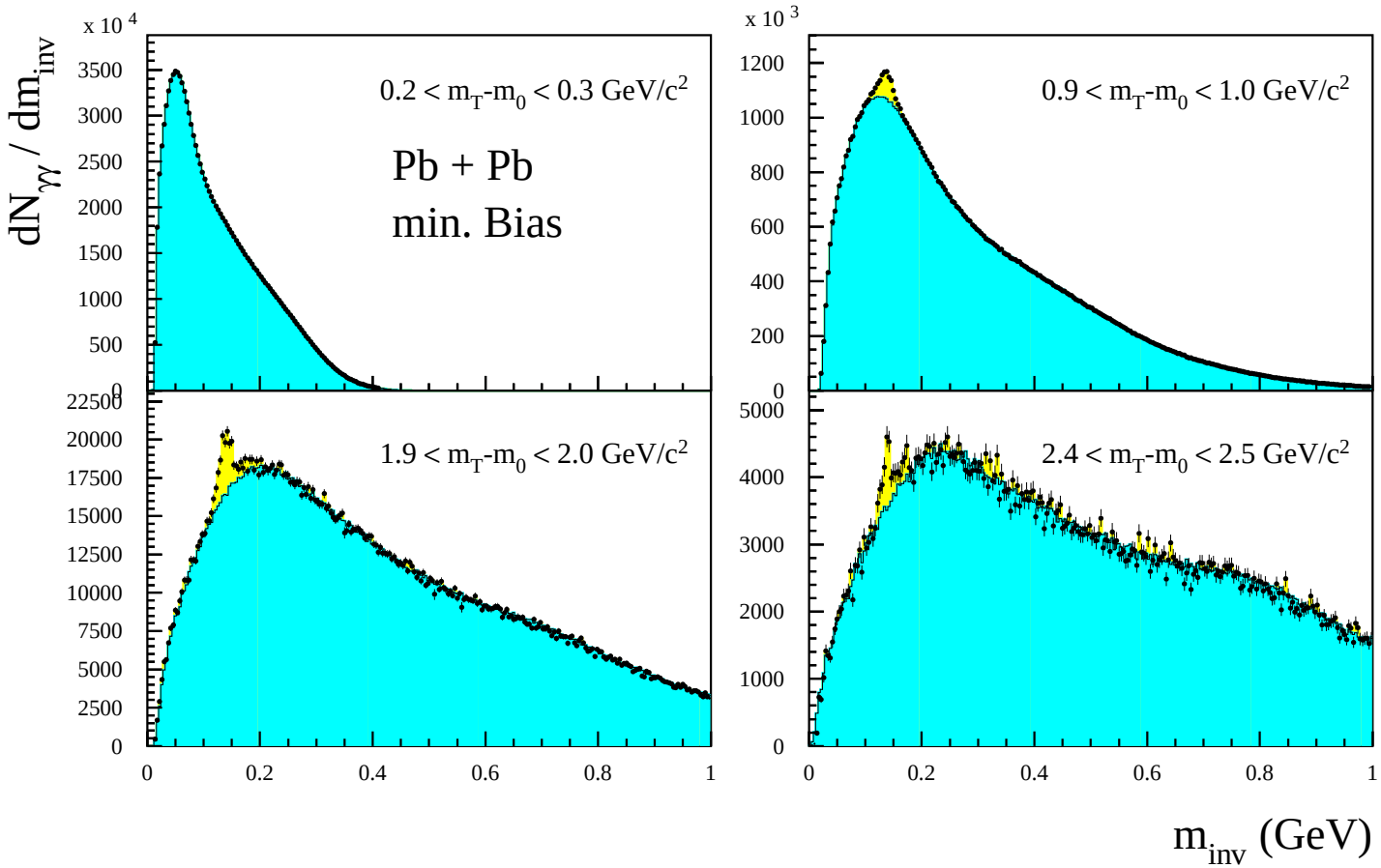
Event mixing method

- select centrality class for each event (e.g. ~ # hits)
- store the last 10 events from each class
- for the event mixing calculate background by combining each hit from the current event with all hits from the last 10 events in its class
- calculate and use the right statistical weight for the mixed events

$$w_{comb} = \frac{n_i - 1}{n_j}, \quad n_i \ : \ \# \text{ hits in the event}, \quad n_j \ : \ \# \text{ hits mixed in}$$

- apply the same cuts to mixed and real pairs (especially : minimal distance between combined hits)

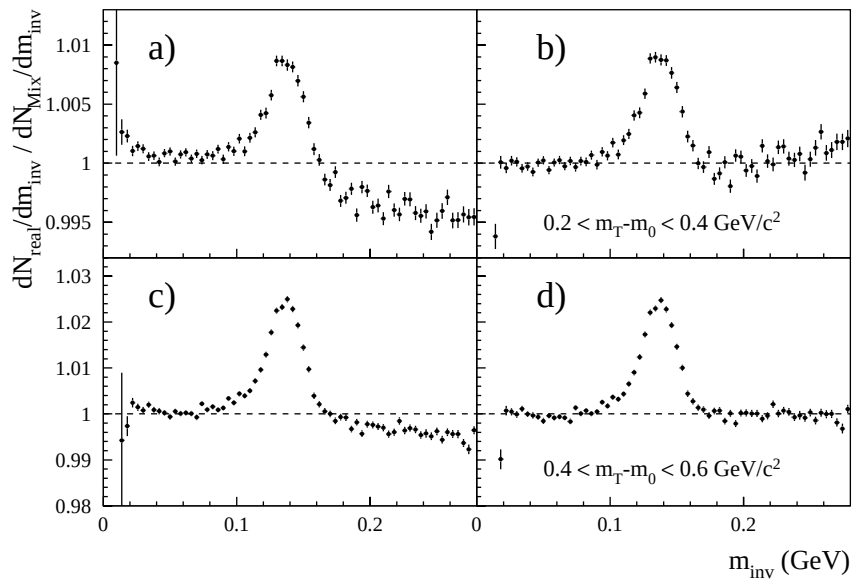
Invariant mass distributions



Normalisation of the background

Problem:

- for small m_T a simple linear scaling is not sufficient (a+c) due to the very steep and small distributions



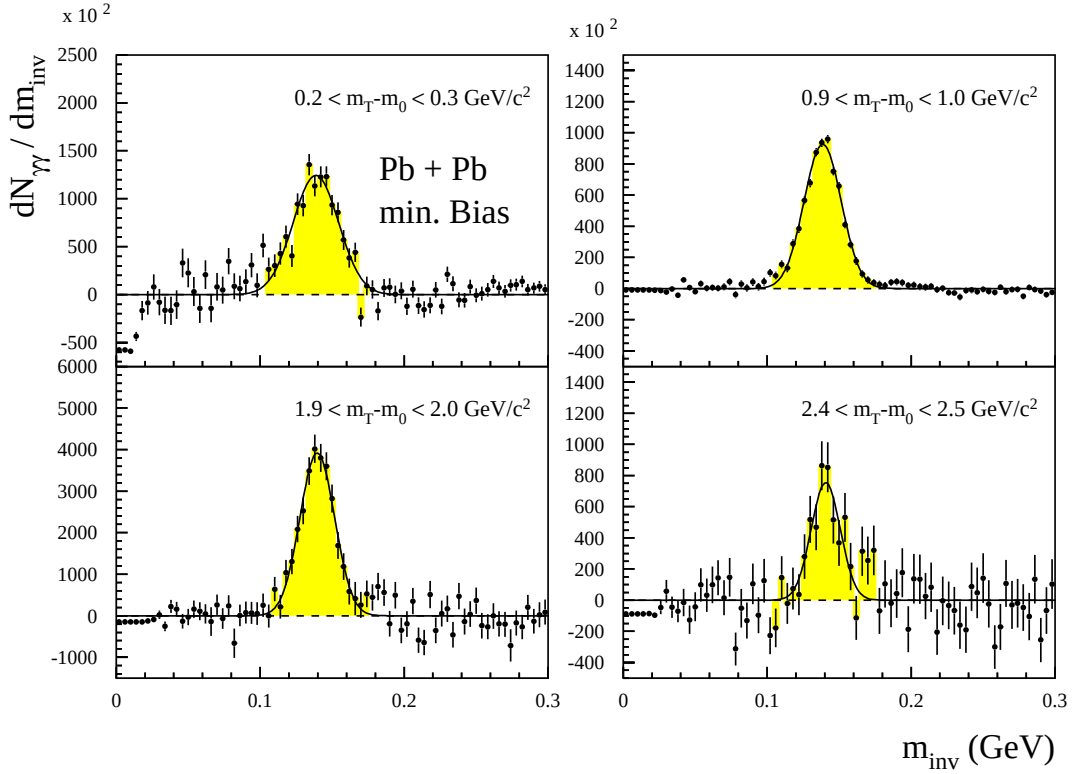
Solution:

- fit the real/mixed ratio by a polynominal, exept $\pm 4\sigma$ region around the π^0 peak (max p3)

- use this fit as an additional scaling (b + d)

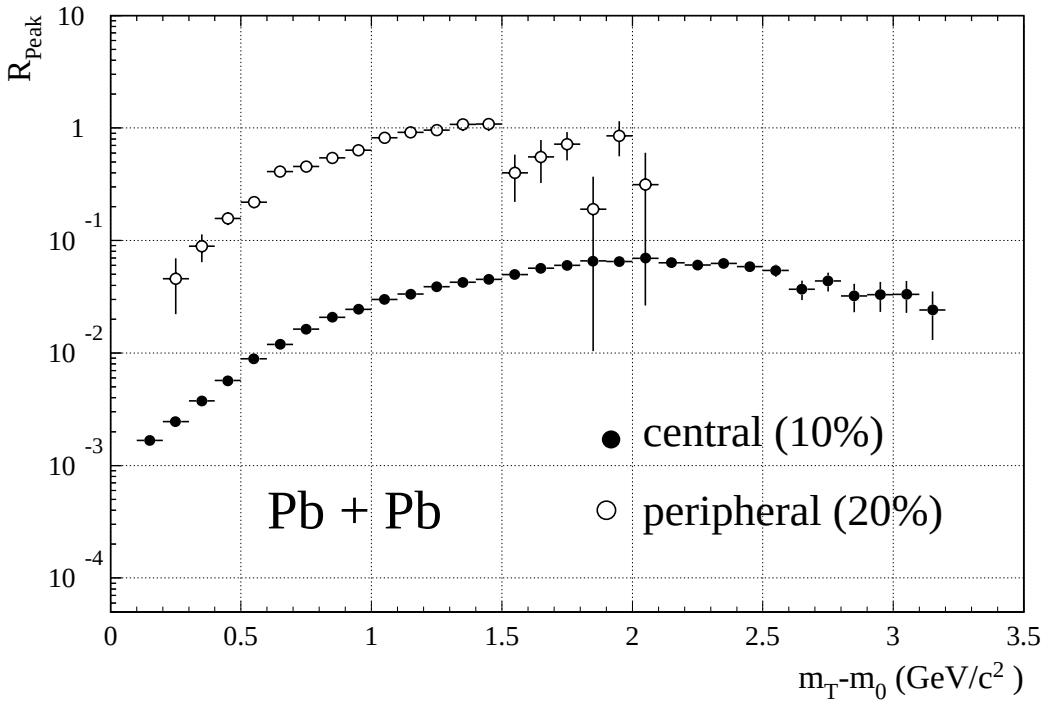
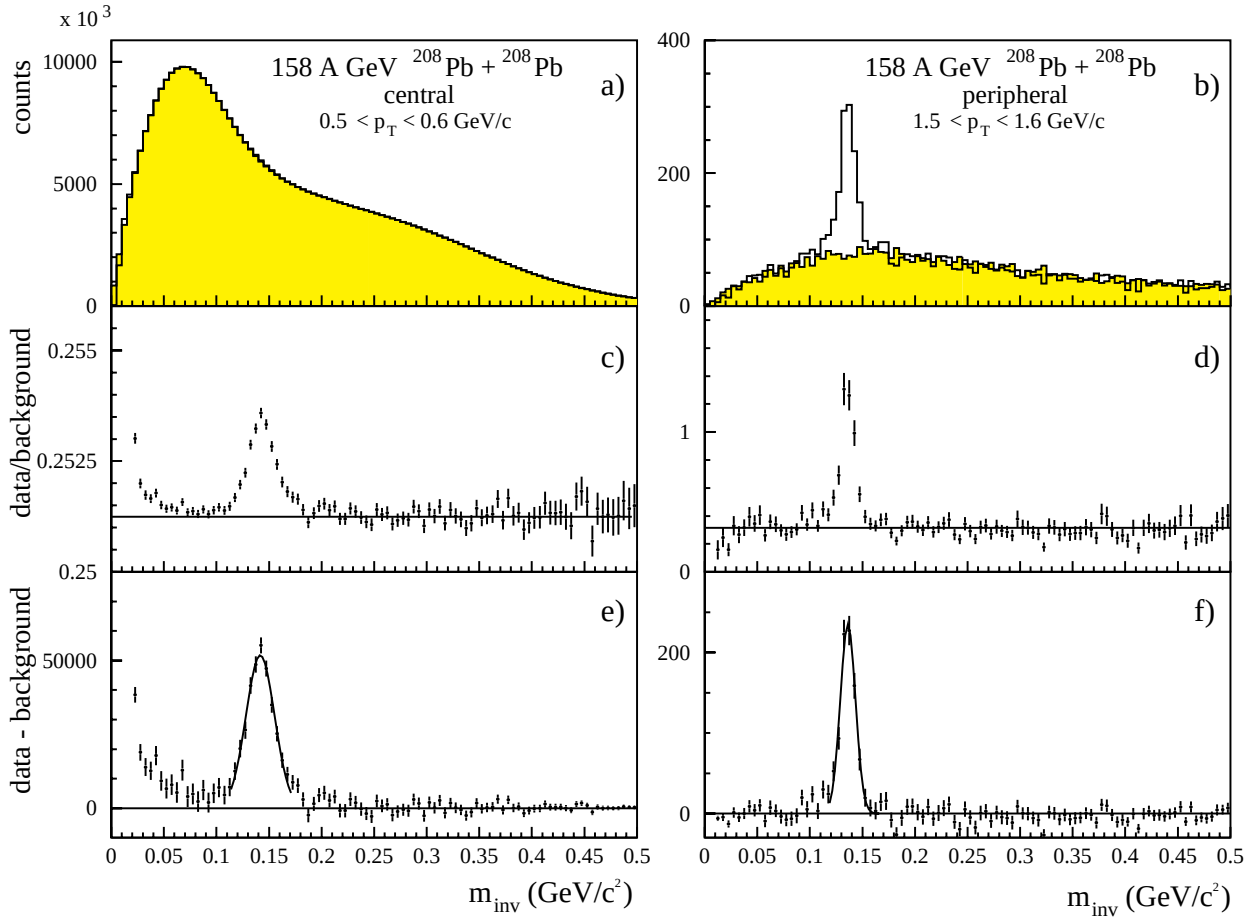
Results

Subtracting the background and fitting the π^0 peak with a gaussian



Signal/background ratio

Obtained by integrating the peak and the background in the same region



Another example