Notes on D^0 Yield Fits

- The fitting function like the BRTW fits essentially a Gaussian plus an N-degree Polynomial to the total output: Signal + Background
- Func = Yield(y) * Gauss + (Pol^NBackgr)
- In order to avoid negatives Yuri likes to introduce a ln for the yields:
  (z == ln y) which then relates the errors as dz=dy/y
- The Significance then is the total signal yield (y) divided by the error on that (dy)
- Significance = y/dy = 1/dz
- Remember z and dz are both reported on the histo plotted by BRTW.C

- One implicit assumption here is that because the background is fitted on a wide range of inv. masses the error of it is negligible (people asked at the meeting how the error of the fitted background is propagated to final error). Of course fitting different polynomial etc etc will yield different backgr. values but this can be treated as systematic NOT statistical error.
- What Witted did, ie fit the background outside the signal range is, in principle o.k. One can look at it as a systematic error study.

• The origin of the undershoots that Jaiby observes next to the signal might be due to particle cross-feeding, ie PID misidentification can make a D0bar a D0 and vice versa. The x-feed will result, as MC has shown, in a wider inv. mass distribution that depends on cuts like cos(theta*). Yuri suggested that on top of the normal Gaussian with 10 MeV fixed width, we also use another with a width of ~80 MeV or whatever the MC tells us it is for the given set of cuts. One can see how a wider gaussian on top of the narrow one, in normal (Jaiby's) fit, can lead to undershoots and smaller S/N. What Wittek does removes this bias from the background but the fit with a single gaussian also leads to wrong estimates because of non-removal of x-feed.