Mirco Andreotti, University of Ferrara
December 2002

Form Factor Analysis: background contamination at χ_0 scan energy.

1 Monte Carlo simulation.

In order to compare the contamination from J/ψ inclusive events at χ_0 and χ_1 energies we have simulated the following reactions:

$$\chi_0 \to J/\psi\gamma \to e^+e^-\gamma \tag{1}$$
$$\chi_1 \to J/\psi\gamma \to e^+e^-\gamma \tag{2}$$

For this purpose we produced for each reaction 10000 events for 5 different runs as summarized in Tab. 1.

χ_0 run	χ_1 run
5473	5120
5475	5122
5477	5126
5893	7086
5900	7087

Table 1: Run number for different conditions of the detector in the simulation.

During the analysis of source files we apply the selection of charged trigger and the restriction on the acceptance, then at the end we will have about a 60% of the initial 100000 events.

2 Calculation of α.

We are interested at the value of the probability α [1], which is the ratio between n_{FF} and N_{FF} defined as:

$N_{FF} \quad \to \quad$ 0) $15^o < \theta_{e^+e^-} < 60^o$ and (2 clusters in CCAL) and $Prb(J/\psi X) > 1\%$ and $Prb(e^+e^-) < 10\%$.

$n_{FF} \quad \to \quad$ 1) (0) and $Prb(e^+e^-) > Prb(J/\psi X)$ and $Prb(e^+e^-) > 1\%$.

In Tab. 2 we report the results from all ten used runs.

	χ_0 (MC)	χ_1 (MC)	χ_1 (data)
α	$(1.2 \pm 0.4) \times 10^{-3}$	$(0.8 \pm 0.4) \times 10^{-3}$	$(1.3 \pm 1.3) \times 10^{-3}$

Table 2: Values of α from the simulation with all runs reported in Tab. 1.

[1] See Mirco's note: "'Form Factor at χ_0 scan energy".

3 Comparisons and conclusions.

From Monte Carlo, a comparison of α between the values from χ_0 and χ_1 shows that they are comparable, then it makes sense to calculate α from χ_1 and use it at the χ_0.