

Optimization of LR Cut

- **Search for new processes**
- G. Punzi, "Sensitivity of searches for new signals and its optimization" pp. 8-11, 2003.

$$FOM(t) = \frac{S(t)}{\sqrt{S(t) + B(t)}}$$



$$FOM(t) = \frac{\varepsilon(t)}{\frac{a}{2} + \sqrt{B(t)}}$$

$S(t)$ the expected numbers of signal events in signal region

$B(t)$ the expected numbers of background events in signal region

t cut value

a number of sigma of desired significance

$\varepsilon(t)$ signal efficiency $\varepsilon(t) = \frac{N_{signal}(t)}{N_{generated}}$

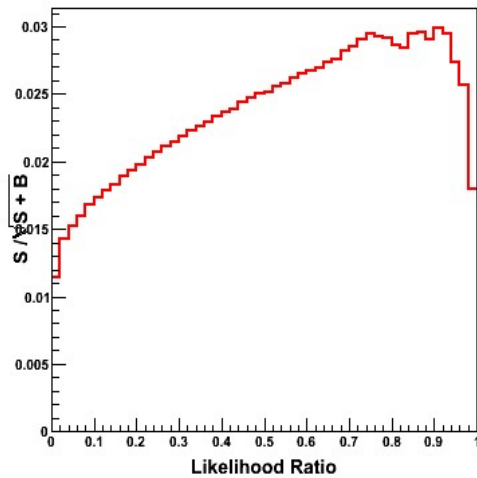
- **Estimation of S / B**
 - S calculated from the signal MC using PDG branching fractions with 772×10^6 BB pairs
 - B calculated from on-resonance continuum MC data (uds + charm) normalized to real data

$$B \rightarrow \eta_c(2S)K \rightarrow ppK$$

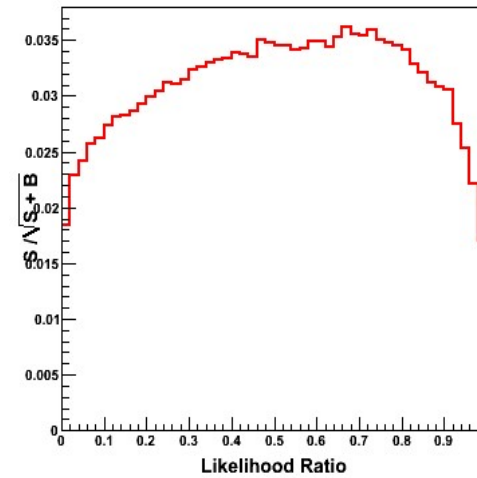
- Figure-Of-Merit Plots as a function of likelihood ratio of control samples

5σ

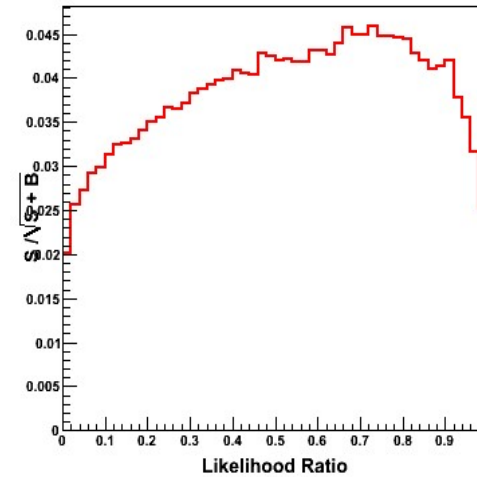
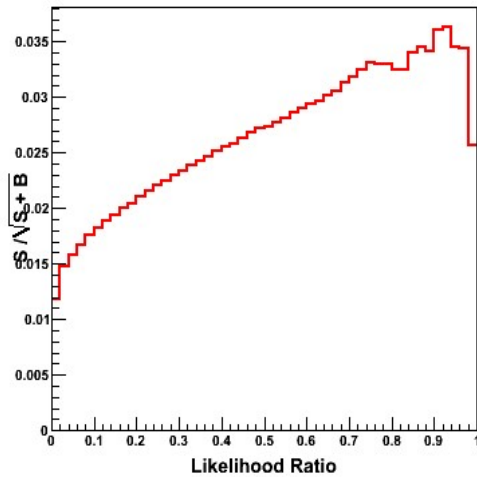
$$B^+ \rightarrow \eta_c(2S)K^+ \rightarrow ppK^+$$



$$B^0 \rightarrow \eta_c(2S)K_s^0 \rightarrow ppK_s^0$$

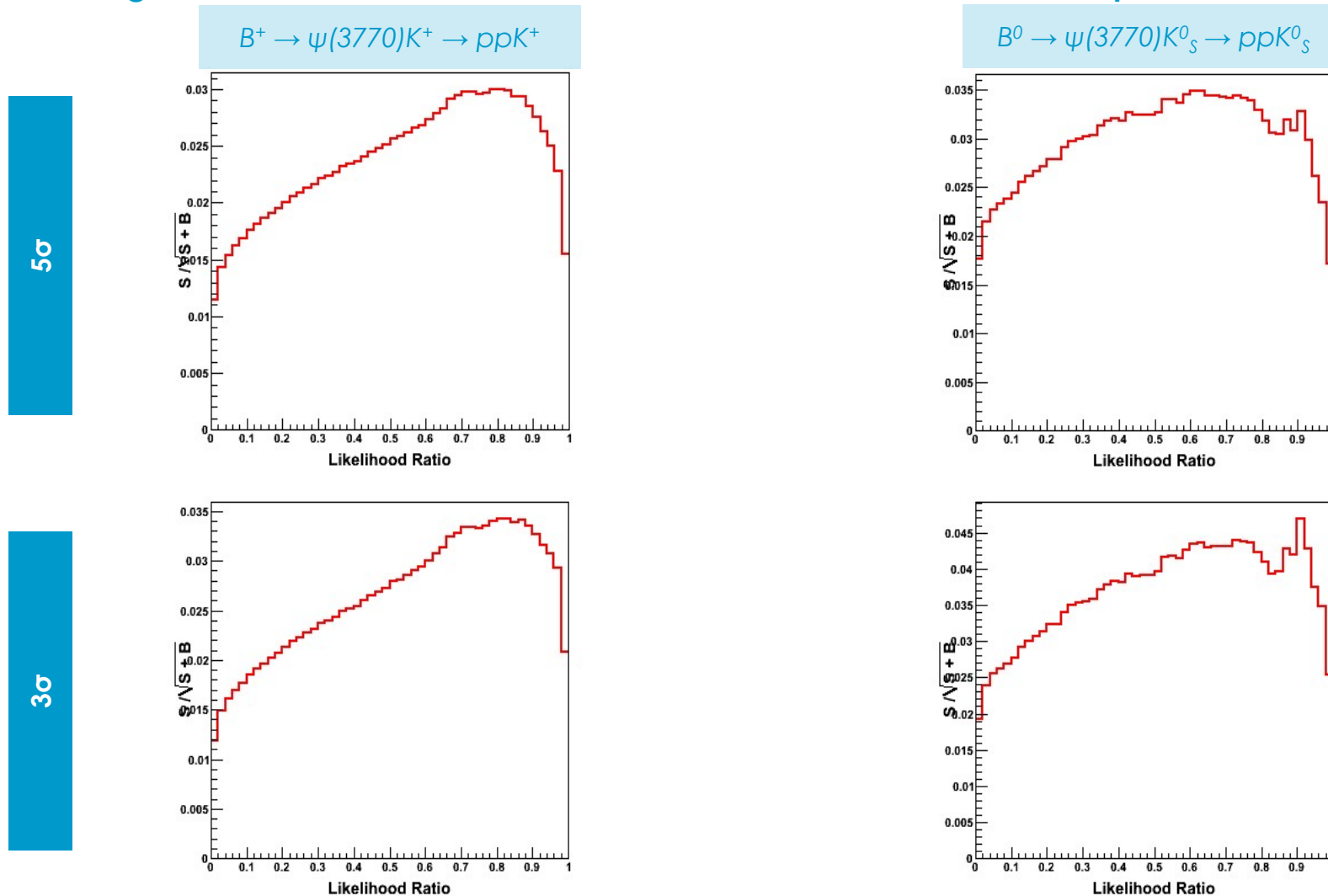


3σ



$B \rightarrow \psi(3770)K \rightarrow ppK$

- Figure-Of-Merit Plots as a function of likelihood ratio of control samples



$$B \rightarrow X(3872)K \rightarrow ppK$$

- Figure-Of-Merit Plots as a function of likelihood ratio of control samples

