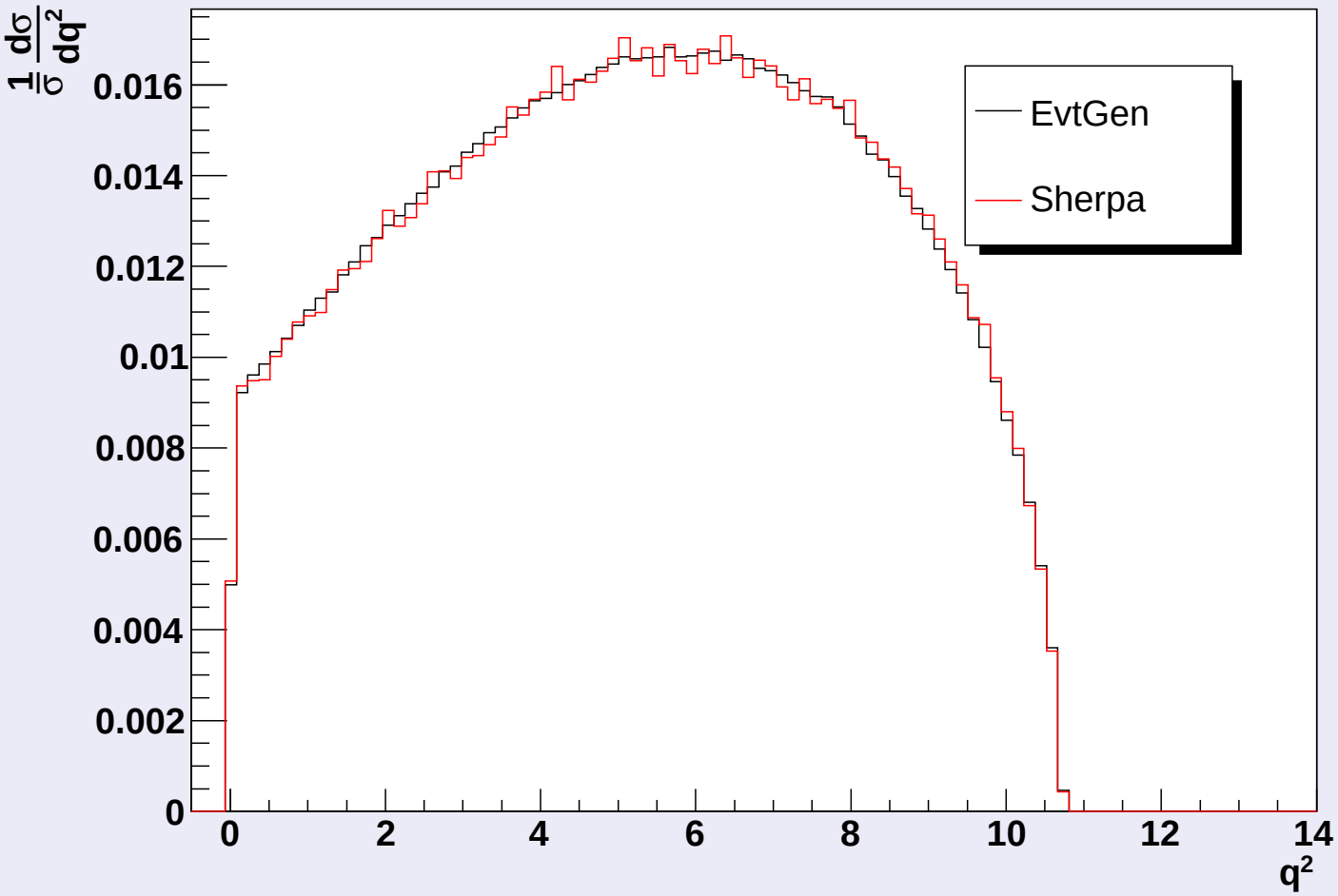
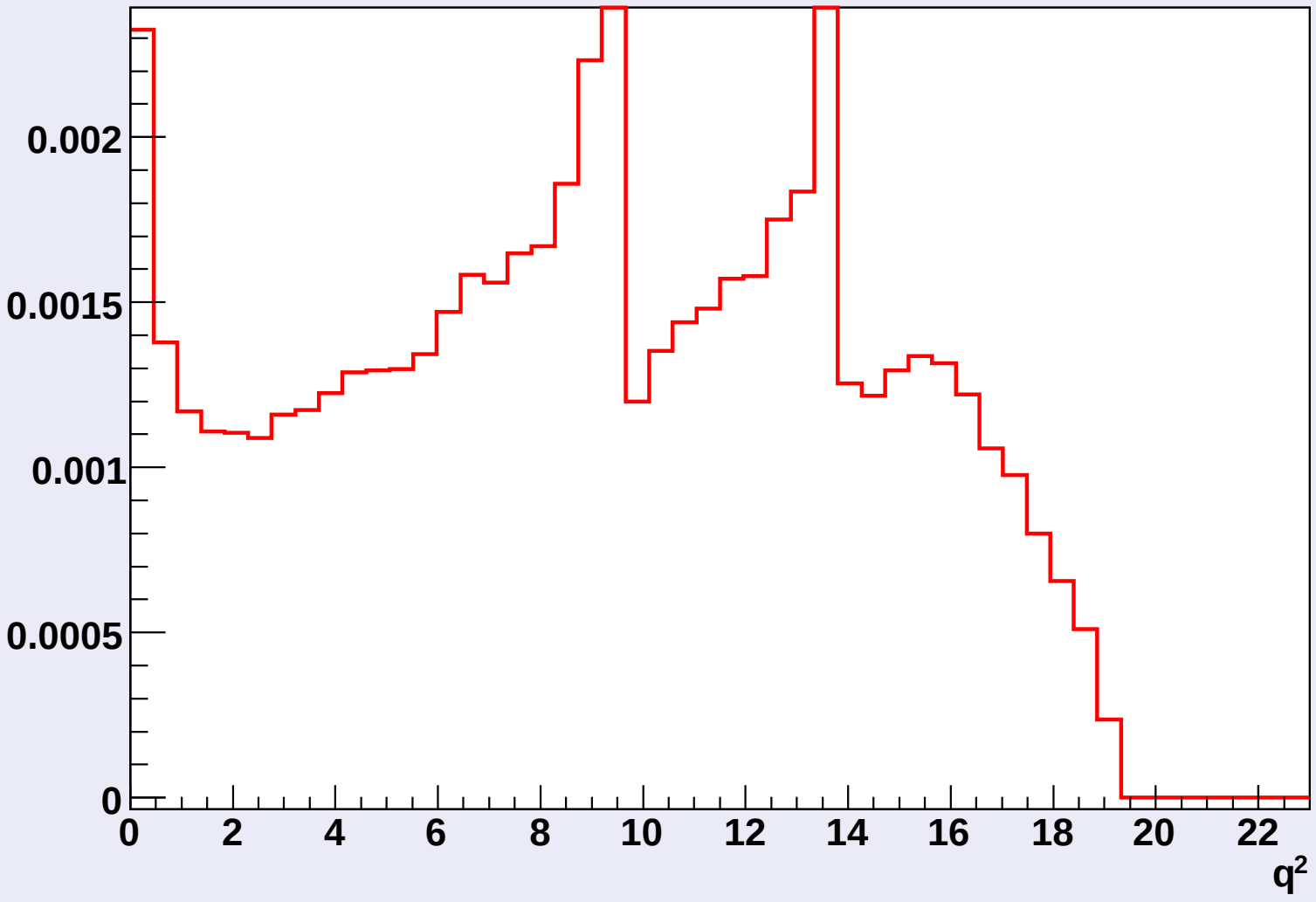
Example: $B^+ \to \overline{D^*(2007)^0}\ \bar{l}\ \nu_l$



Example: $B^+ \to K^*(892)^+ \; \mu^- \; \mu^+$



Some B^+ decay channels with implemented matrix elements

- $B^+ \to \bar{D}^*(2007)\ \nu_l\ l^+$
- $B^+ \to \bar{D}^0\ \nu_l\ l^+$
- $B^+ \to D(1)(2420)b\ \nu_l\ l^+$
- $B^+ \to D(2)*(2460)b\ \nu_l\ l^+$
- $B^+ \to D(0)*(2400)b\ \nu_l\ l^+$
- $B^+ \to D(1)(2430)b\ \nu_l\ l^+$
- $B^+ \to D^-\ \pi^+\ \nu_l\ l^+$
- $B^+ \to \bar{D}^0\ \pi^0\ \nu_l\ l^+$
- $B^+ \to \bar{D}^*(2010)^+\ \pi^+\ \nu_l\ l^+$
- $B^+ \to \bar{D}^*(2007)\ \pi^0\ \nu_l\ l^+$
- $B^+ \to \pi^0\ \nu_l\ l^+$
- $B^+ \to \eta\ \nu_l\ l^+$
- $B^+ \to \rho_{(770)}\ \nu_l\ l^+$
- $B^+ \to \omega_{(782)}\ \nu_l\ l^+$
- $B^+ \to \eta'_{(958)}\ \nu_l\ l^+$
- $B^+ \to f_{0(980)}\ \nu_\tau\ \tau^+$
- $B^+ \to a^0_{1(1260)}\ \nu_\tau\ \tau^+$
- $B^+ \to K^+\ l^-\ l^+$
- $B^+ \to K^{*+}_{(892)}\ l^-\ l^+$
- $B^+ \to \bar{D}^0 \pi^+$
- $B^+ \to \bar{D}^0 K^+$
- $B^+ \to \bar{D}^* (2007) \pi^+$
- $B^+ \to \bar{D}^* (2007) K^+$
- $B^+ \to \bar{D}^0 \pi^+ \pi^0$
- $B^+ \to \bar{D}^0 K^+ K$
- $B^+ \to \bar{D}^0 K \pi^+$
- $B^+ \to \bar{D}^0 K^+ \pi^0$
- $B^+ \to \bar{D}^* (2007) \pi^+ \pi^0$
- $B^+ \to \bar{D}^* (2007) K^+ K$
- $B^+ \to \bar{D}^* (2007) K \pi^+$
- $B^+ \to \bar{D}^* (2007) K^+ \pi^0$
- $B^+ \to \bar{D}^0 \pi^+ \pi^+ \pi^-$
- $B^+ \to \bar{D}^0 \pi^+ \pi^0 \pi^0$
- $B^+ \to \bar{D}^0 K \pi^+ \pi^0$
- $B^+ \to \bar{D}^0 K^+ \pi^+ \pi^-$
- $B^+ \to \bar{D}^0 K^+ \pi^0 \pi^0$
- $B^+ \to \bar{D}^0 K^+ K^- \pi^+$
- $B^+ \to \bar{D}^0 K^+ K \pi^0$
- $B^+ \to \bar{D}^0 \pi^+ K K$
- $B^+ \to \bar{D}^0 K^+ K^+ K^-$
- $B^+ \to \bar{D}^* (2007) \pi^+ \pi^+ \pi^-$
- $B^+ \to \bar{D}^* (2007) \pi^+ \pi^0 \pi^0$
- $B^+ \to \bar{D}^* (2007) K \pi^+ \pi^0$
- $B^+ \to \bar{D}^* (2007) K^+ \pi^+ \pi^-$
- $B^+ \to \bar{D}^* (2007) K^+ \pi^0 \pi^0$
- $B^+ \to \bar{D}^* (2007) K^+ K^- \pi^+$

Some B^+ decay channels with implemented matrix elements

- $B^+ \to \bar{D}^*(2007) K^+ K \pi^0$
- $B^+ \to \bar{D}^*(2007) \pi^+ K K$
- $B^+ \to \pi^+ \pi^0$
- $B^+ \to K^+ \pi^0$
- $B^+ \to \eta \pi^+$
- $B^+ \to K^+ \eta$
- $B^+ \to \eta'_{(958)} \pi^+$
- $B^+ \to \eta'_{(958)} K^+$
- $B^+ \to \omega_{(782)} \pi^+$
- $B^+ \to K^+ \omega_{(782)}$
- $B^+ \to D(s)+ \pi^0$
- $B^+ \to a^0_{1(1260)} \pi^+$
- $B^+ \to K^0 \pi^+$
- $B^+ \to K^+ \bar{K}^0$
- $B^+ \to f_{0(980)} K^+$
- $B^+ \to a^+_{0(980)} K^0$
- $B^+ \to a^0_{0(980)} K^+$
- $B^+ \to a^0_{0(980)} \pi^+$
- $B^+ \to a^+_{0(980)} \pi^0$
- $B^+ \to K^{*0}_{0(1430)} \pi^+$
- $B^+ \to \bar{K}^{*0}_{0(1430)} K^+$
- $B^+ \to K^{*+}_{0(1430)} \pi^0$
- $B^+ \to K^{*+}_{0(1430)} \bar{K}^0$
- $B^+ \to \pi^+ \pi^0 \pi^0$
- $B^+ \to \eta \pi^+ \pi^0$
- $B^+ \to K^0 \eta \pi^+$
- $B^+ \to K^+ \eta \pi^0$
- $B^+ \to K^+ \bar{K}^0 \eta$
- $B^+ \to \eta'_{(958)} \pi^+ \pi^0$
- $B^+ \to \eta'_{(958)} K^0 \pi^+$
- $B^+ \to \eta'_{(958)} K^+ \pi^0$
- $B^+ \to \eta'_{(958)} K^+ \bar{K}^0$
- $B^+ \to K^+ \pi^0 \pi^0$
- $B^+ \to K^0 \pi^+ \pi^0$
- $B^+ \to K^+ \bar{K}^0 \pi^0$
- $B^+ \to \pi^+ \rho_{(770)} \pi^0$
- $B^+ \to \omega_{(782)} \pi^+ \pi^0$
- $B^+ \to f_{0(980)} \pi^+ \pi^0$
- $B^+ \to f_{0(980)} K^+ \pi^0$
- $B^+ \to f_{0(980)} K^0 \pi^+$
- $B^+ \to \pi^+ \pi^0 \pi^0 \pi^0$
- $B^+ \to \pi^+ \pi^+ \pi^- \pi^0$

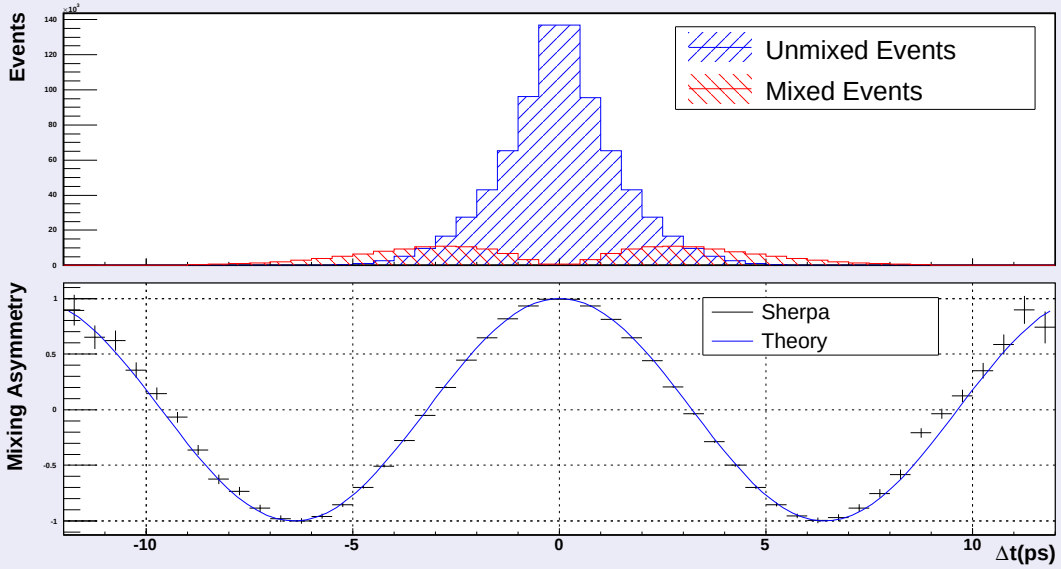
Mixing of neutral mesons – explicitely

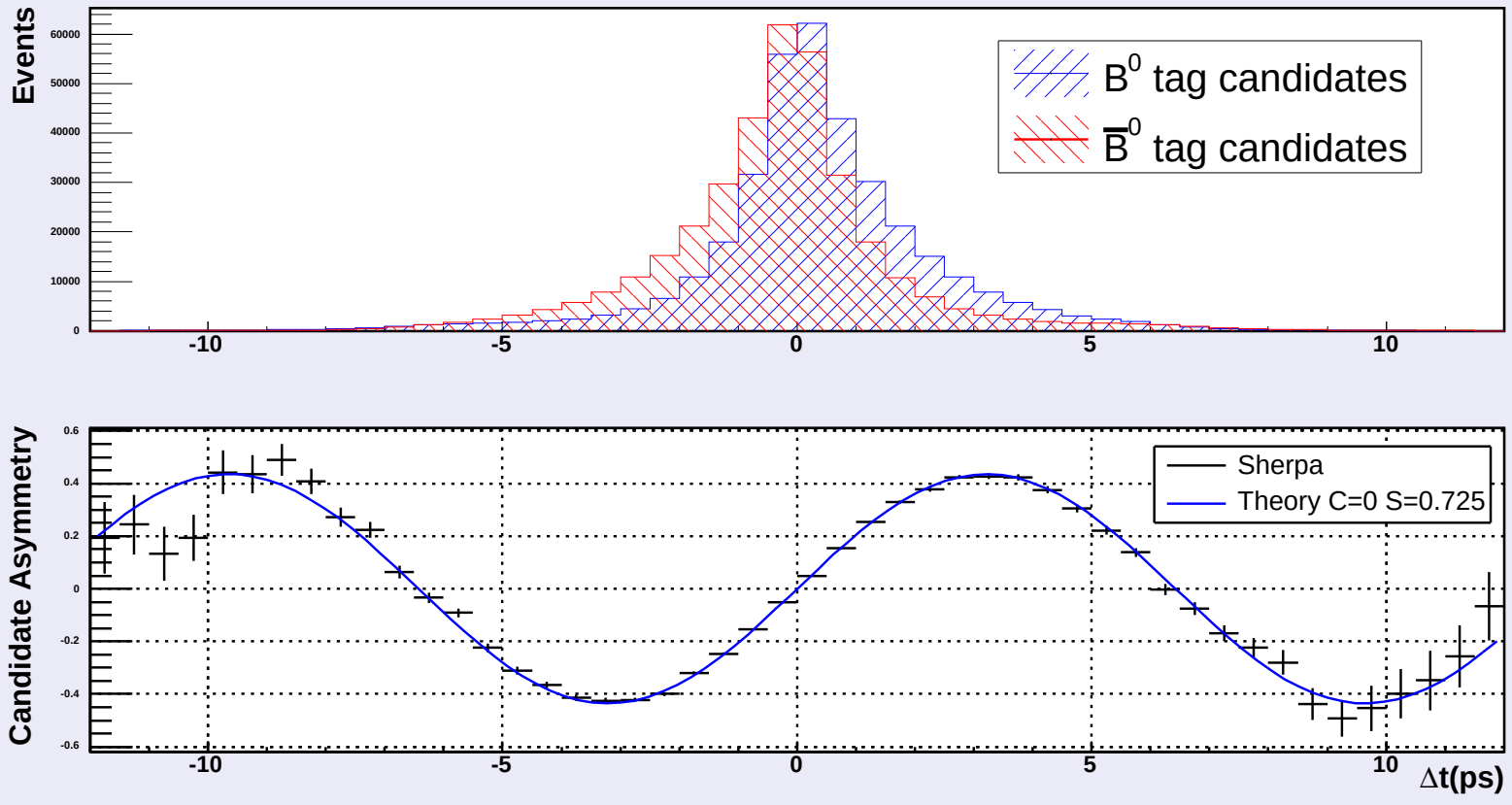
$$P(N^0 \to \bar{N}^0) \sim \left|\frac{q}{p}\right|^2 \left(\cosh\frac{\Delta\Gamma\, t}{2} - \cos\Delta m\, t\right)$$

$$P(\bar{N}^0 \to N^0) \sim \left|\frac{p}{q}\right|^2 \left(\cosh\frac{\Delta\Gamma\, t}{2} - \cos\Delta m\, t\right)$$

CP-Violation: $\left|\frac{q}{p}\right| \neq 1 \Longleftrightarrow P(N^0 \to \bar{N}^0) \neq P(\bar{N}^0 \to N^0)$

Implementation: e.g. $B^0\bar{B}^0$-pairs, $\Delta\Gamma \approx 0$, $\left|\frac{q}{p}\right| = 1$



Example: $B_d \to J/\Psi K_S$

- $\Im(\lambda_{fCP}) = \sin(2\beta)$
- Simulated mistag fraction $w = 0.2$