$$|V_{cb}|_{incl}$$

$$\Gamma(B \to X_c l \nu_l) = \frac{G_F^2 m_b^5}{192 \pi^3} |V_{cb}|^2 f_1(m_b, m_c, \lambda_1, \lambda_2, \alpha_s)$$

Most recent : Bigi, Shifman, Uraltsev, Vainshtein
(Update of SUV-95)

$$|V_{cb}|_{incl} = 41.0 \left[\frac{Br(B \to X_c l \nu)}{0.104}\right]^{1/2} \left[\frac{1.6\ ps}{\tau_B}\right]^{1/2} \cdot 10^{-3}$$

$$\cdot \left[1 \pm 0.015^{*)}_{pert} \pm 0.01_{m_b} \pm 0.012_{\lambda_1} \pm 0.012\right]$$

optimistic; duality etc.

*) Czarnecki, Melnikov (97)

BSUV (97)

$$|V_{cb}|_{incl} = \left[\frac{Br(B \to X_c l \nu)}{0.104}\right]^{1/2} \left[\frac{1.6\ ps}{\tau_B}\right]^{1/2} \begin{bmatrix} 41.0 \pm 2.0_{th} \\ 38.8 \pm 2.0_{th} \end{bmatrix} \cdot 10^{-3}$$

Ball, Benecke, Braun (95)

$\tau_B = 1.60 \pm 0.03$ ps

$Br(B \to X_c l \nu) = 10.4 \pm 0.4\%$

$$|V_{cb}|_{incl} = \left\{ \begin{matrix} 41.0 \\ 38.8 \end{matrix} \pm 2.0_{th} \pm 0.9_{exp} \right\} 10^{-3}$$