• THE OFF-RESONANCE CONTRIBUTIONS FROM \( V^{AB,NAB}(s) \) AND \( B^{WW}(s) \) ARE VANISHINGLY SMALL AT LEP1 ENERGIES

• HOWEVER, THEY ARE VERY IMPORTANT BEYOND RESONANCE, IN PARTICULAR AT LEP2

• TO PRESERVE GAUGE CANCELLATION IT IS NECESSARY TO ADD BOX CONTRIBUTION
\[ R = \frac{\sigma_{e\bar{e}\rightarrow dd}^{IBA} - \sigma_{e\bar{e}\rightarrow bb}^{IBA}}{\sigma_{e\bar{e}\rightarrow dd}^{IBA}}, \% \]

**DOUBLE DECONVOLUTED →**

- **NO ISR QED**
- **NO FSR QED × QCD**

\[ \sigma_{e\bar{e}\rightarrow dd}^{IBA} \rightarrow \text{UNIVERSAL} \]
\[ \sigma_{e\bar{e}\rightarrow bb}^{IBA} \rightarrow \text{UNIVERSAL} + \text{NON-UNIVERSAL} \]
\[ V(s) + B(s, t) \]

\[ A = \frac{1}{s - M_{Z}^2 + iM_{Z}\Gamma_{Z}} \left[ V^{Zbb}(s) + (s - M_{Z}^2) \left( \frac{V^{\gamma bb}(s)}{s} + B^{WW}(s, t) \right) \right] \]

\[ V = V_0 + V_t \]
\[ B = B_0 + B_t \]