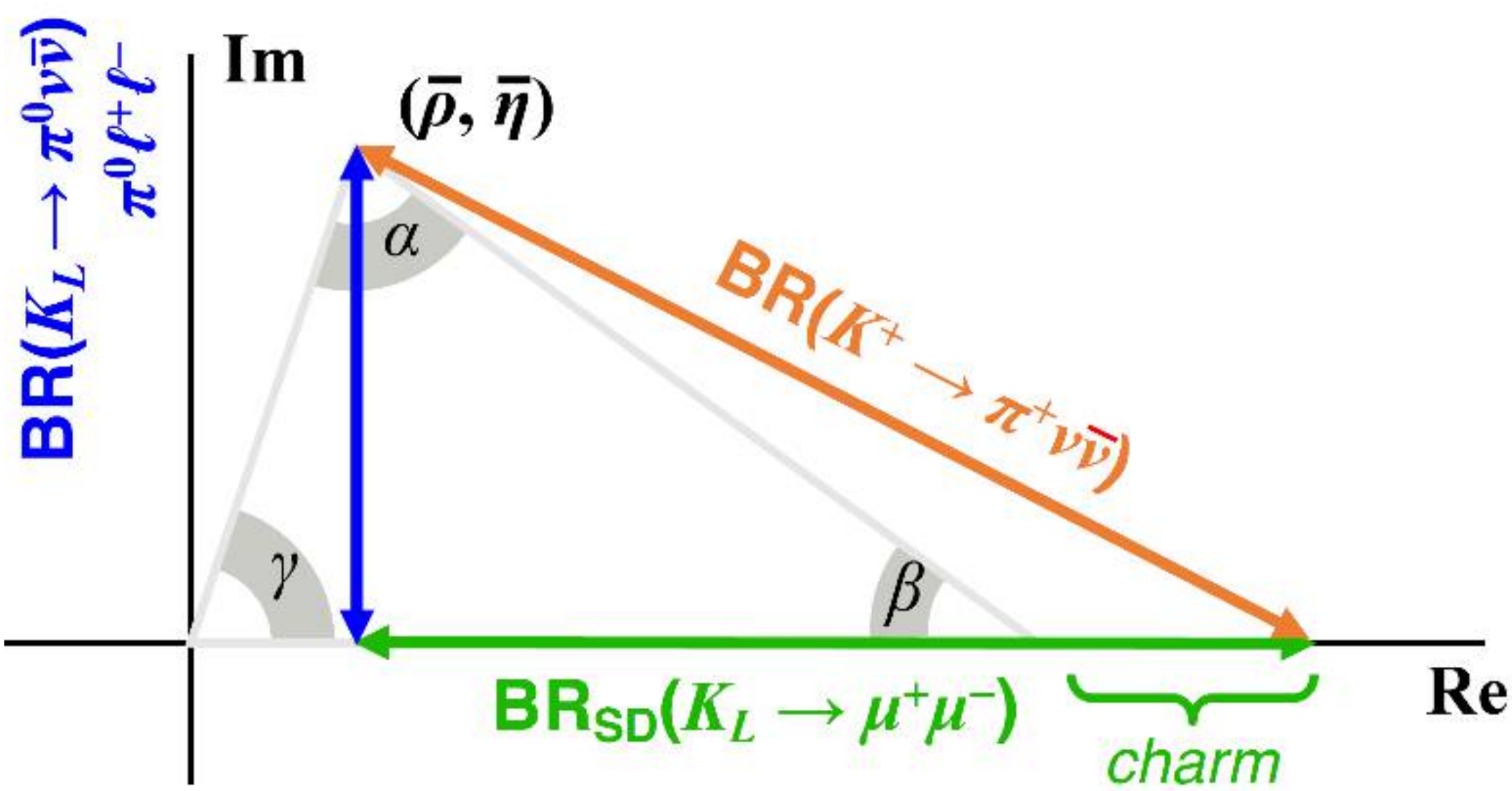*Over-constrain CKM matrix unitarity triangles, seek New Physics.*

Helicity based background reduction for NA-62
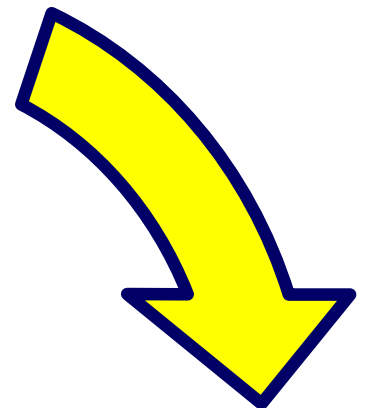
Mihai-Tiberiu Dima

Use very clean mode with minimal non-parametric uncertainties:
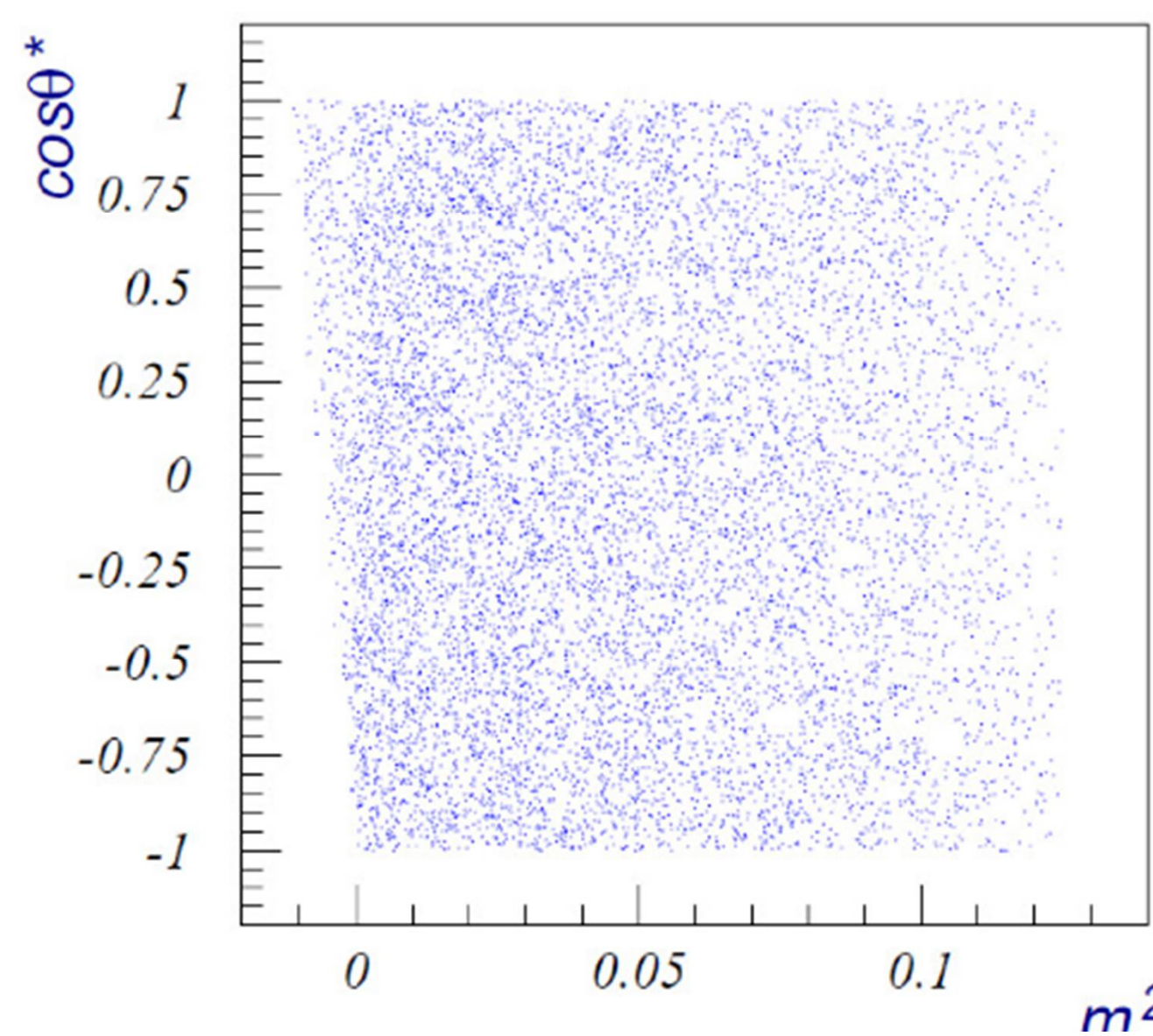
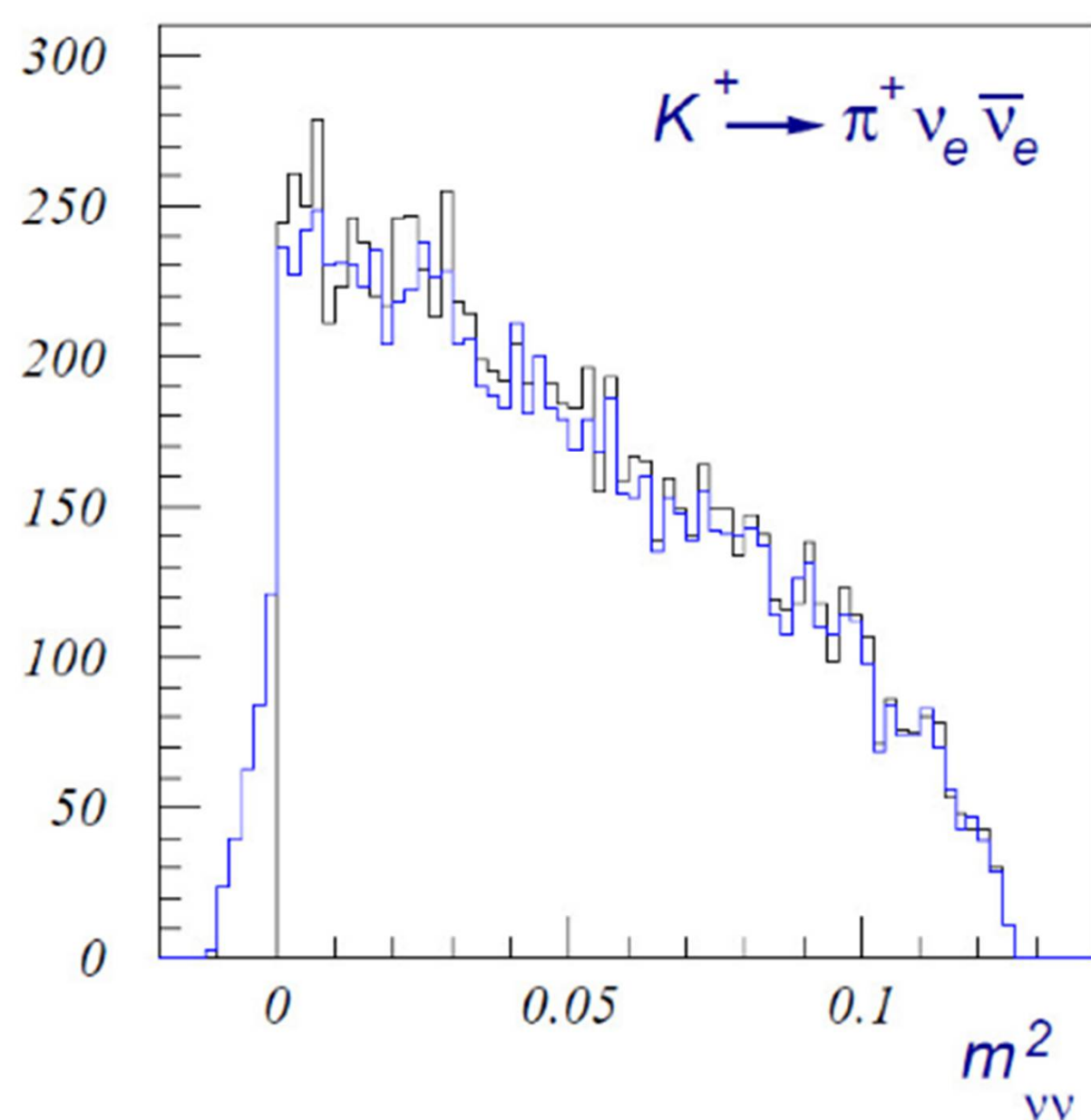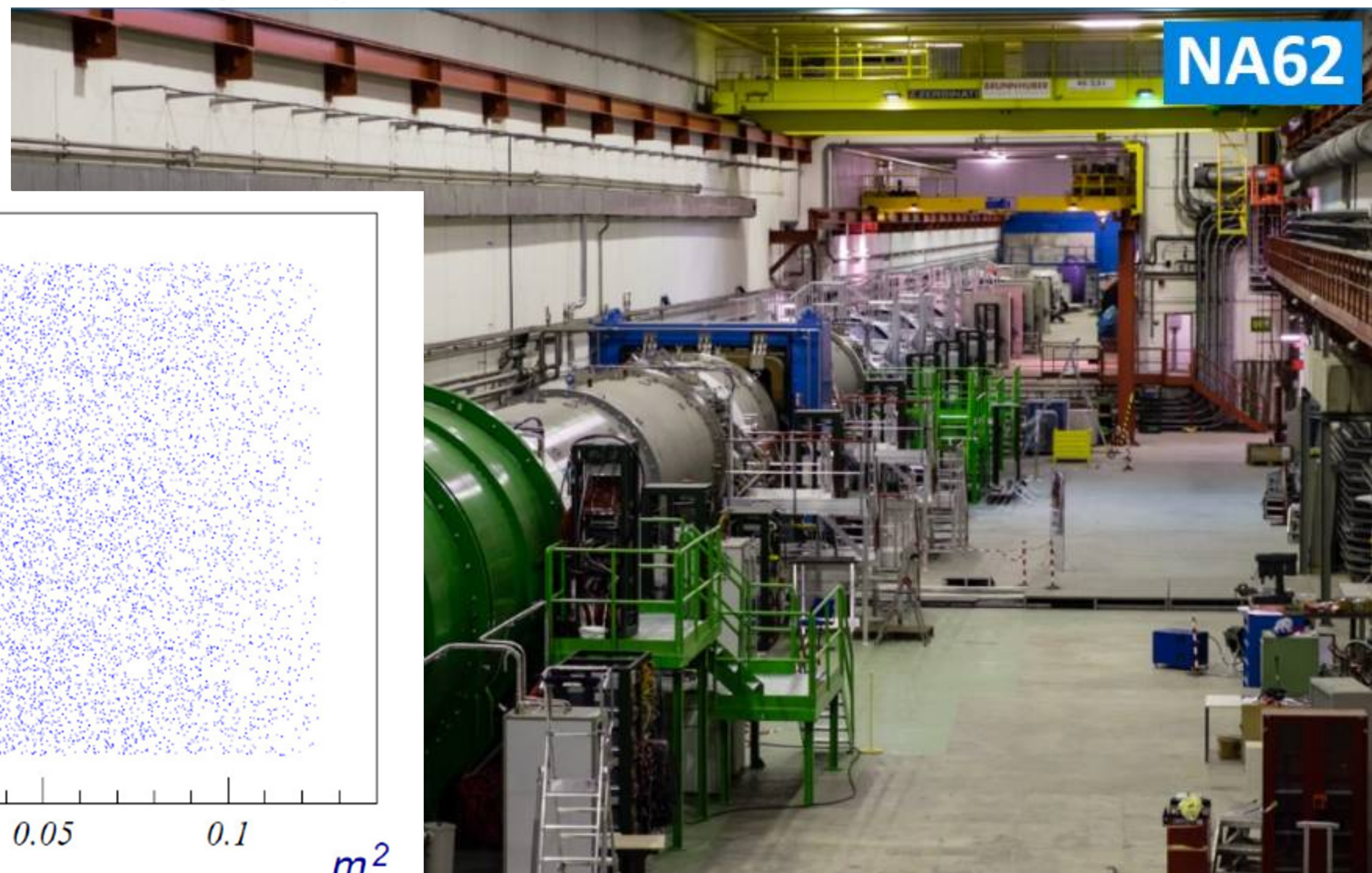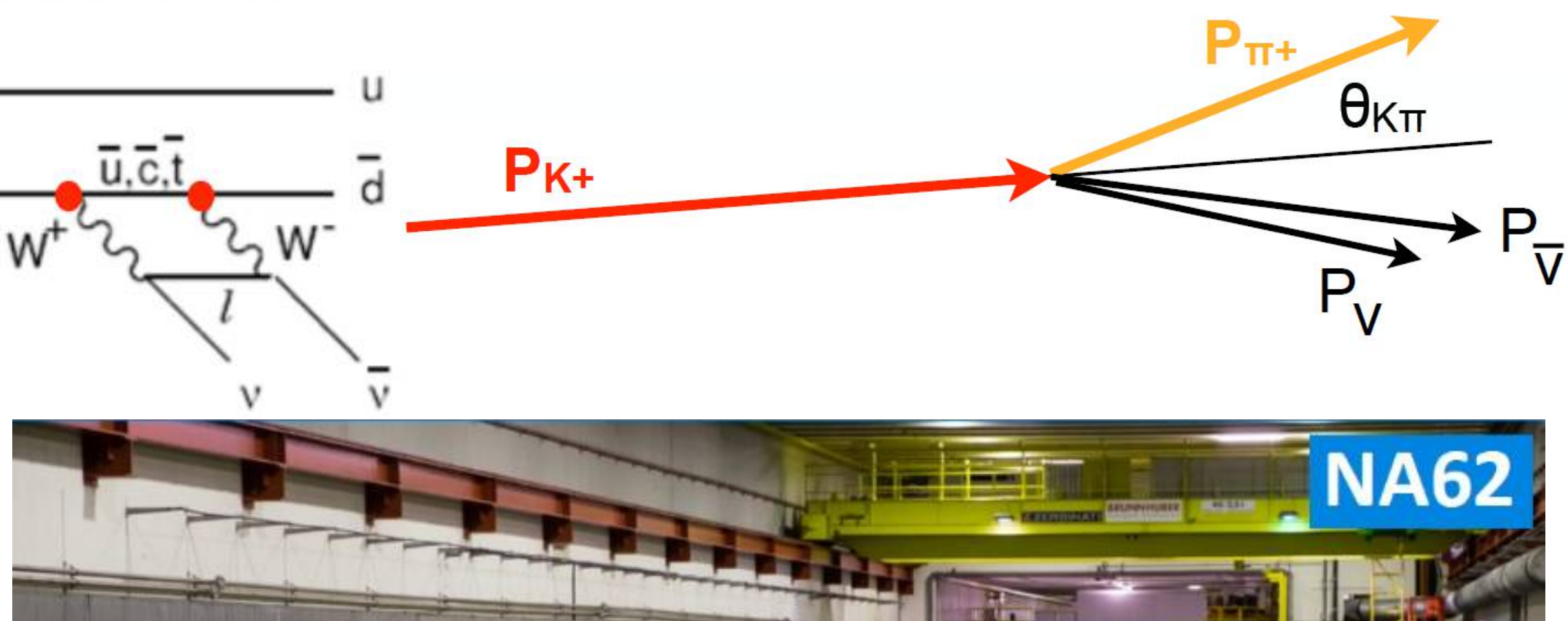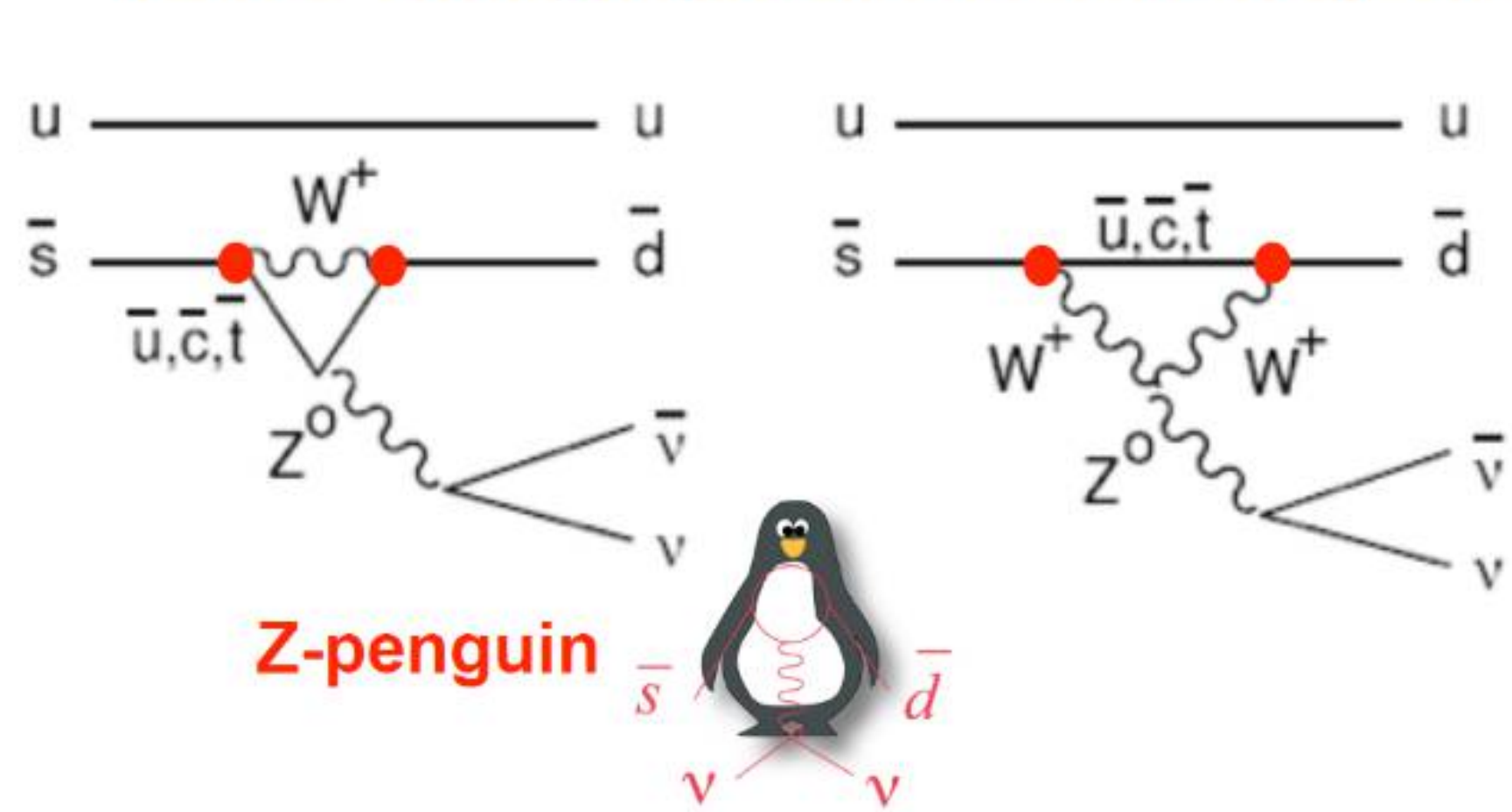$\Rightarrow$ *determine alone matrix elements*

Buras et al.,
JHEP 1511

$$\mathrm{BR}(K^+ \to \pi^+ \nu \bar{\nu}) = (8.39 \pm 0.30) \times 10^{-11} \cdot \left[\frac{|V_{cb}|}{0.0407}\right]^{2.8} \cdot \left[\frac{\gamma}{73.2°}\right]^{0.74}$$

$$\mathrm{BR}(K_L \to \pi^0 \nu \bar{\nu}) = (3.36 \pm 0.05) \times 10^{-11} \cdot \left[\frac{|V_{ub}|}{3.88 \times 10^{-3}}\right]^2 \cdot \left[\frac{|V_{cb}|}{0.0407}\right]^2 \cdot \left[\frac{\sin\gamma}{\sin 73.2°}\right]^2$$

$K^+ \to \pi^+ \nu\nu$ extremely suppressed

Flavor-changing neutral current quark transition s→dνν

Z-penguin

NA62

Signal uniformly distributed in helicity (see above).

BCKG backboosted (see right).

Good way to cut bckg out without mass-cut !

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