

# **NuFact Oscillation Working Group**

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## **Limits on the beam divergence and its uncertainties**

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# Limits on the $\mu$ beam divergence and its uncertainty.

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Table 1:

"neutrino flux uncertainty < 1% for  $\nu$ -factory"

Factors contributing to the uncertainty:

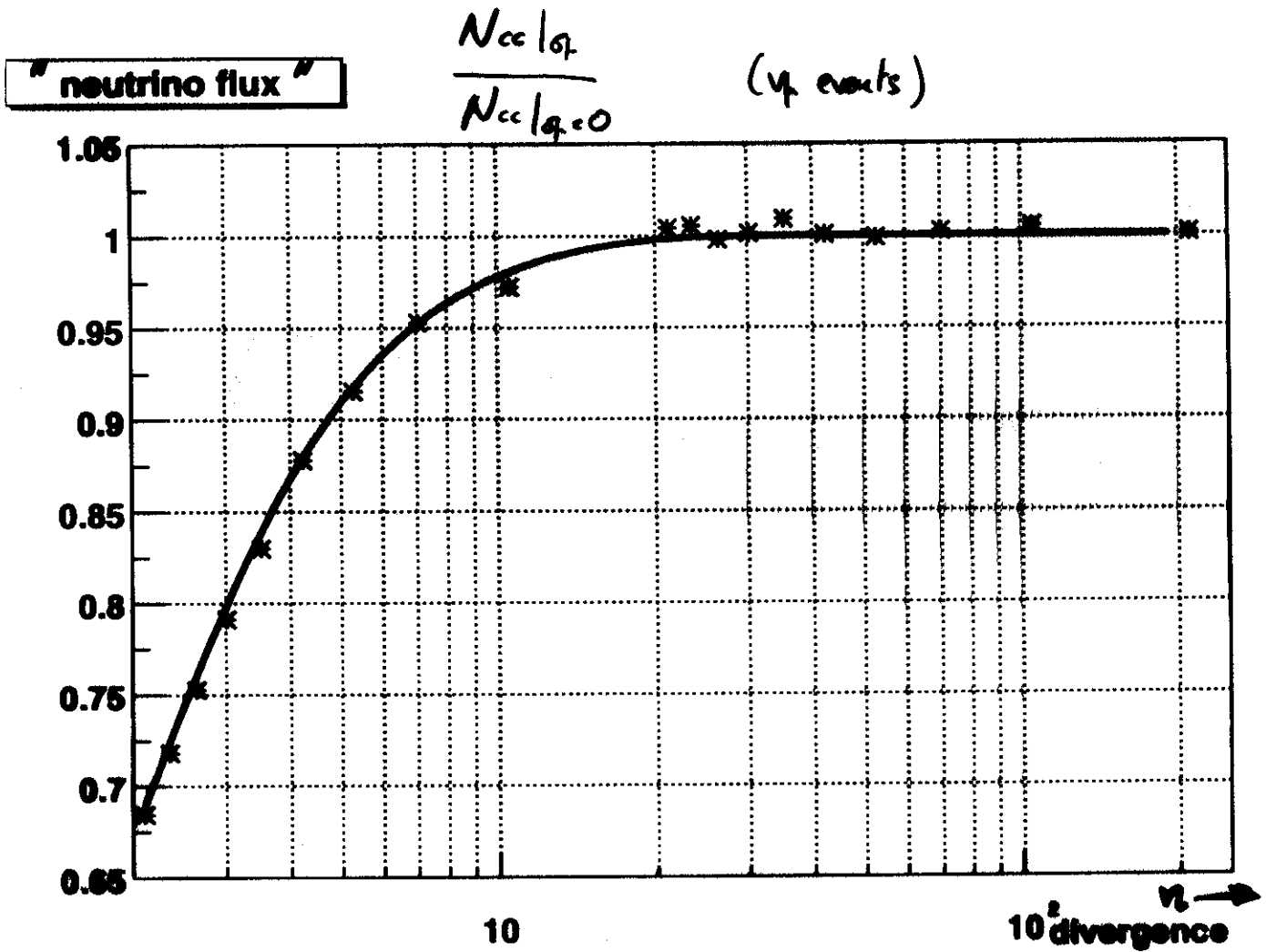
- Energy spread of muons
- Angular divergence of muons
- polarization of muons
- physics of the decay

→ for what follows,  $\mu$  polarization is assumed to be known with infinite precision.

→ Detector at 3500 km,  $R = 25\text{ m}$

→  $E_{\nu} = 50\text{ GeV}$  ( $\pm 0.1\%$ )

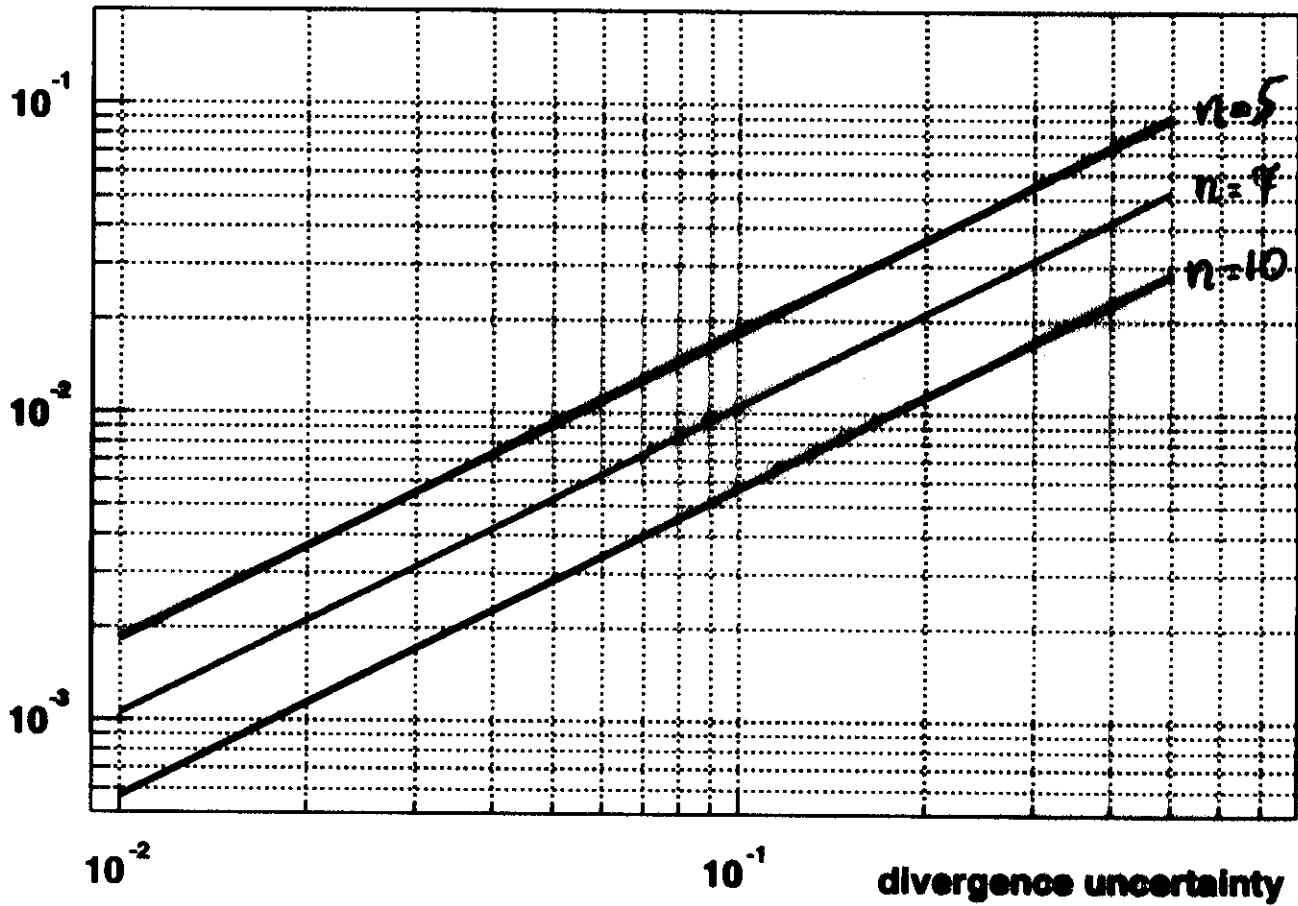
→ Polarization: 0.



$$\sigma_{\nu} = \frac{1}{2\gamma}$$

flux uncertainty

$$\frac{\delta\phi}{\phi}$$



divergence uncertainty

$$\frac{\delta\eta}{\eta}$$