Could we have a Prism for Neutrinos?

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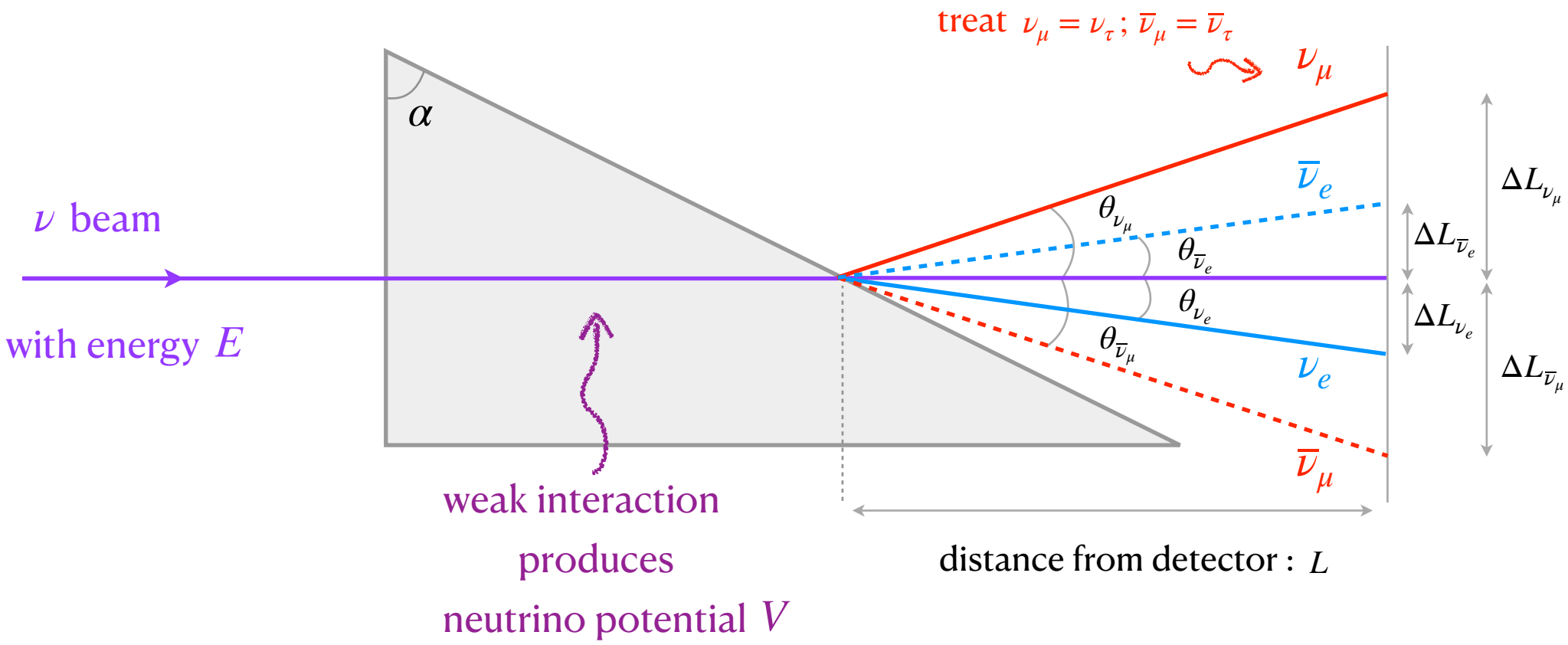
Yes! But the effect is...

Reference

Physics Picture (not to scale)



Take-home Messages

- Refractive angles as being derived in geometric optics
- Refractive angles depend on geometry and material of prism, energy, flavour and neutrino/anti-neutrino.
- Order of the angles ~ 10^{-22} rad for given energy and prism

→ **have prism** for neutrinos theoretically

Angles θ's & Deflections ΔL's

$$\theta_{\nu_l} \approx (V_{\nu_l}/E)\tan\alpha \quad ; \quad \Delta L_{\nu_l} = L\tan\theta_{\nu_l}$$

- For prism made of lead with $\alpha = \pi/3$
  Given E = 1 GeV ; V ~ 10^{-13} eV ; L = 300 km

ν_l	ν_e	$\overline{\nu}_e$	ν_μ	$\overline{\nu}_\mu$
θ_{ν_l} (10^{-22} rad)	1.41	−1.41	−4.53	4.53
ΔL_{ν_l} (10^{-7} Å)	4.24	−4.24	−13.6	13.6

Motivation for studying

- Filter neutrinos to have pure flavour or accurate energy
- To enhance neutrino event rate for detecting relic neutrinos

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