(b) the maximum excursion to the left is to approximately $\langle P \rangle$, and it occurs at $|\Delta m^2| = \pi/2b_0$ eV^2;
(c) for large $\sin^2 2\theta$, $\Delta m^2 \propto (\sin^2 2\theta)^{-1/2}$; and
(d) the intercept at $\sin^2 2\theta = 1$ is at $\sqrt{\langle P \rangle}/b_0$.

The intercept for large $|\Delta m^2|$ is just a measure of running time and backgrounds, while the intercept at $\sin^2 2\theta = 1$ also depends on the mean value of L/E. The wiggles depend on the experimental resolution, but aside from such details the two intercepts completely describe the exclusion region: For large $|\Delta m^2|$, $\sin^2 2\theta$ is constant, and for large $\sin^2 2\theta$ the constant slope is known. For these reasons, it is (nearly) sufficient to summarize the results of an experiment by stating the two intercepts, as is done in the following tables. The reader is referred to the original papers for the two-dimensional plots expressing the actual limits.

If a positive effect is claimed, then the excluded region becomes an included region. This is the case for the HIRATA 92 analysis of R(μ/e) for atmospheric neutrinos.

In a "disappearance" experiment, one looks for the attenuation of the beam neutrinos (for example, ν_k) by mixing with at least one other neutrino eigenstate. (We label such experiments as $\nu_k \not\to \nu_k$.) These experiments fall into two general classes:

(a) Those in which the beam neutrino flux is known, from theory or other measurements. In the high-$|\Delta m^2|$ region, where the oscillation length is small compared to the size of the apparatus, the oscillations are in both directions and the beam intensity is reduced by a factor of two (for two-component mixing). In this case, indicated qualitatively by the "Disappearance A" curve in Fig. 1. sensitivity is maintained for large $|\Delta m^2|$, but with no simple rule relating this asymptote to the maximum excursion to the left. An example is provided by the VUILLEUMIER 82 measurements at the Gösgen reactor.
(b) Those in which the intensity must be measured in the apparatus itself (two detectors, or a "long" detector). Then above some minimum $|\Delta m^2|$ the equilibrium is established upstream, and there is no change in intensity over the length of the apparatus. As a result, sensitivity is lost at high $|\Delta m^2|$, as is qualitatively indicated by the curve "Disappearance B" in Fig. 1. See, for example, DYDAK 84.

Finally, there are more complicated cases, such as in the HIRATA 92B analysis of the Kamiokande II solar neutrino data in terms of the MSW parameters. An irregular region on the $|\Delta m^2|$ vs $\sin^2 2\theta$ is excluded for a combination of physical reasons. It is difficult to represent adequately these graphical data within the strictures of our tables.

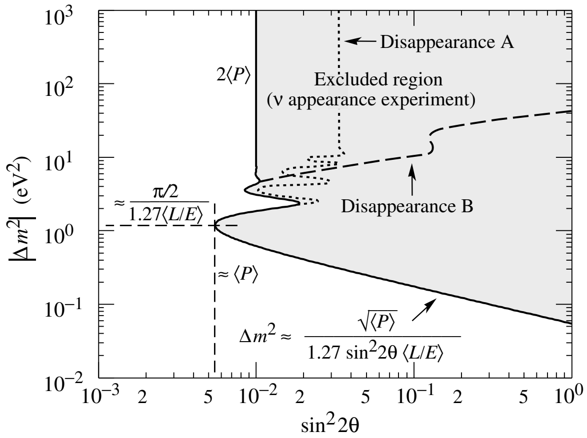

Figure 1: Neutrino oscillation parameter ranges excluded by a toy experiment in which one searches for the appearance of neutrinos not expected in the beam. The probability of appearance, in this case 0.5% at some specified CL, is set by the number of right-flavor events observed and/or information about the flux and cross sections. Here it is assumed that $\langle L/E \rangle = 1$ km GeV^{-1}, and that the distribution of L/E is Gaussian with a 20% standard deviation. The wiggle structure is determined by the resolution function, and the intercepts are determined by the appearance probability and $\langle L/E \rangle$. The leftmost excursion relative to the high-$|\Delta m^2|$ limit and the slope of the lower part of the curve are independent of the experiment. In a disappearance experiment, high-$|\Delta m^2|$ sensitivity is lost unless the incident flux is known. These two possibilities are shown qualitatively by the dashed lines marked "Disappearance A" and "Disappearance B."