

UPPER LIMIT ON THE ν_τ MASS*

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This is an update of a result published¹ by the Mark II collaboration. Since the only change is a 50% increase in the data sample I will be brief.

We have collected data with a luminosity of 220 pb^{-1} with the Mark II detector at the e^+e^- storage ring PEP at a center of mass energy of 29 GeV. We looked for $\tau^+\tau^-$ events in which one of the τ 's decayed to $3\pi^\pm\pi^0\nu_\tau$. The shape of the high mass end of the 4π mass spectrum from this decay is sensitive to the ν_τ mass.

The figure shows this mass spectrum. The portion above $1.5 \text{ GeV}/c^2$ was compared to the expected behavior for various ν_τ masses and a limit on m_{ν_τ} inferred. There are 22 events in the fit region. We assumed the spectrum is dominated by the ρ' resonance (this gives a less stringent limit than phase space).

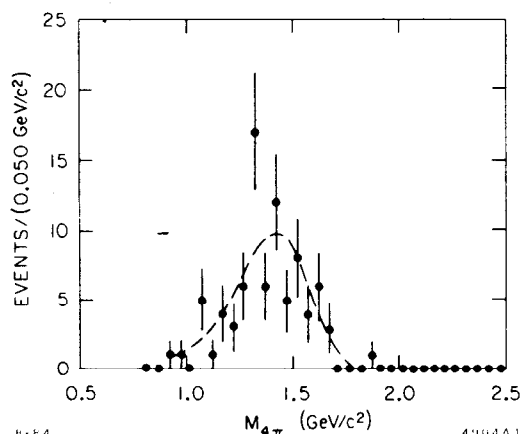


Fig. 1. The $3^\pm\pi^0$ invariant mass distribution for selected decays. The curve is for $m_{\nu_\tau} = 0$ and the assumption that the four pion state is dominated by the ρ' resonance.

After including uncertainties in background, resolution, and knowledge of the ρ' mass and width we obtain an upper limit on the ν_τ mass of $143 \text{ MeV}/c^2$ at the 95% CL.

References

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