$$(m_{13}^2)_{\min} =$$

$$(E_1^* + E_3^*)^2 - \left(\sqrt{E_1^{*2} - m_1^2} + \sqrt{E_3^{*2} - m_3^2}\right)^2 \quad , \qquad (23.24b)$$

where $E_3^* = (M^2 - m_{12}^2 - m_3^2)/(2m_{12})$ and $E_1^* = (m_{12}^2 + m_1^2 - m_2^2)/(2m_{12})$. The scatter plot in m_{12}^2 and m_{13}^2 has uniform phase space density [see Eq. (23.23)] and is called a Dalitz plot.

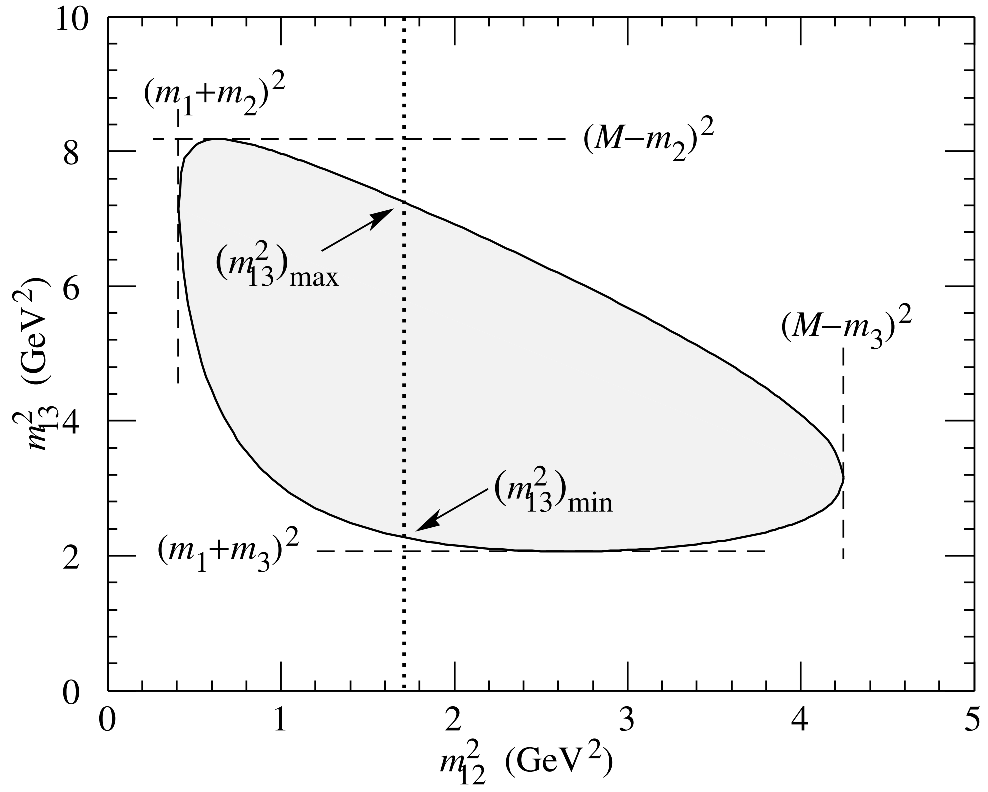

Figure 23.3: Dalitz plot for a three-body final state. In this example, the state is $\overline{K}^0\pi^+p$ at 3 GeV. Four-momentum conservation restricts events to the interior of the closed curve.

A nonuniformity in the plot gives immediate information on $|\mathscr{M}|^2$. For example, in the case of $D \to K\pi\pi$, bands appear when $m_{(K\pi)} = m_{K^*(892)}$, reflecting the appearance of the decay chain $D \to K^*(892)\pi \to K\pi\pi$.