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1) $(p^+ + p^-)^2 \geq (m_\tau + m_\tau)^2$

$|\vec{p^+}| = m_\mu \gamma v_+ \qquad E^\pm = \sqrt{|\vec{p^\pm}|^2 + m_\mu^2}$

$\longrightarrow |\vec{p^-}| \geq \frac{|\vec{p^+}|A + \sqrt{A^2|\vec{p^+}|^2 - 4m_\mu^2 B}}{2m_\mu^2}$

$A = m_\mu^2 - 4m_\tau^2 < 0$

$B = 4m_\mu^2 m_\tau^2 + |\vec{p^+}|^2 m_\mu^2 - 4m_\tau^2$

2) $\beta_\tau^* = \frac{\sqrt{E_\tau^* - m_\tau^2}}{E_\tau^*}$

$E_\mu^{*+} + E_\mu^{*-} = 2E_\mu^* = E_\tau^{*+} + E_\tau^{*-} = 2E_\tau^*$

$E_\mu^* = \gamma_{CM}(E^+ + \beta_{CM}|\vec{p^+}|)$

$\beta_{CM} = \frac{|\vec{p}_+| - |\vec{p}_-|}{\sqrt{|\vec{p}_+|^2 + m_\mu^2} + \sqrt{|\vec{p}_-|^2 + m_\mu^2}}$