

$$\Gamma = \int_{m_1^2}^{M^2} dm_{12}^2 \int_0^{(\frac{M^2-m_1^2}{2m_{12}})^2 - (\frac{M^2-m_1^2+2m_{12}^2}{2m_{12}})^2} dm_{23}^2 \left\{ \frac{1}{4} \cdot [2M^2 - 2m_{12}^2 + m_3^2 + m_2^2 - m_{23}^2] \cdot [2m_{12}^2 + m_{23}^2 - 2m_1^2 - m_3^2 - m_2^2] - \frac{1}{2} \cdot [m_{23}^2 - m_2^2 - m_3^2] \cdot [2M^2 + 2m_1^2 - m_{23}^2] \right\}$$