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Triangle singularity in J/ψ to $\eta\pi^0\phi$

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BESIII Collaboration has reported the observation of $a_0^0(980) - f_0(980)$ mixing. From the Dalitz plot of BESIII's paper for the decay $\eta \rightarrow \gamma\gamma$, one can see that there is a peak around 1.4 GeV on $\pi^0\phi$ distribution. In general, this peak can be interpreted as a dynamically resonance state or a kinematic effect. In this paper, by using the effective Lagrangian method to calculate a triangle diagram includes $K^* \bar{K} K$ loop for isospin breaking process $J/\psi \rightarrow \eta\pi^0\phi$, we show that there is a peak appears in the Dalitz plot where the invariant mass of $\pi^0\phi$ around 1.4 GeV by virtue of the triangle singularity. This may explain the peak around 1.4 GeV of BESIII's experimental results. But whether the peak is the effect of triangle singularity or a resonance state requires further experimental results.

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