Radiative vector meson decays $\omega \to \pi^0\eta\gamma$ and $\rho \to \pi^0\eta\gamma$

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The nature and the quark substructure of the scalar mesons, isoscalar $f_0(980)$ and isovector $a_0(980)$, have not been established yet, whether they are conventional states, molecules or states, have been a subject of controversy. We study the vector meson, ω and ρ, decays into $\pi^0\eta\gamma$ using the framework of a phenomenological approach in which the contributions of vector meson dominance, chiral loops, a_0-meson intermediate state and the effects of $\rho-\omega$ - mixing are considered. For $\omega \to \pi^0\eta\gamma$ and $\rho \to \pi^0\eta\gamma$ decays the $\rho - \omega$ - mixing was found non negligible. The VMD contribution is very small for the $\rho \to \pi^0\eta\gamma$ decay but a_0-meson intermediate state amplitude makes a substantial contribution. For $\omega \to \pi^0\eta\gamma$ case, the dominant contribution is VMD but the a_0-meson intermediate state amplitude should be considered. The loop contribution is also found small for these decays due to the relatively high mass of the kaons.

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