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Unified dispersive approach to $\gamma^* \rightarrow \gamma \pi$ π and $\gamma \gamma \rightarrow \pi \pi$ at low energy

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We discuss how to generalize the classic results on photon-photon scattering which combine dispersion theoretical constraints with chiral symmetry and soft photon theorems to the photon-photon*(q^2) scattering amplitude into a pion pair. This generalisation requires a specific treatment of resonance exchange diagrams. The constructed amplitude displays explicitly the dependence on π - π phase-shifts, pion electromagnetic form factors (being also sensitive to the ω - π form factor puzzle) and pion polarizabilities. It is matched to the NLO ChPT amplitude near zero energies and compared to experimental measurements of $e^+ e^- \rightarrow \gamma \pi^0 \pi^0$ by SND and CMD-2 below one GeV. Applications are made to the pions generalized polarizabilities, to the sigma meson (pole) electromagnetic form factor and to the $\gamma \pi \pi$ contribution to the HVP and the muon $g-2$.

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