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The anomalous process gamma pi –> pi pi and its impact on the pi^0 transition form factor

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The process gamma pi –> pi pi, in the limit of vanishing photon and pion energies, is determined by the chiral anomaly. This reaction can be investigated experimentally using Primakoff reactions, as currently done at COMPASS. We derive a dispersive representation that allows to extract the chiral anomaly from cross-section measurements up to 1 GeV, where effects of the rho resonance are included model-independently via the pi-pi P-wave phase shift. We discuss how this amplitude serves as an important input to a dispersion-theoretical analysis of the pi^0 transition form factor, which in turn is a vital ingredient to the hadronic light-by-light contribution to the anomalous magnetic moment of the muon.

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