

Vector-meson dominance revisited

Stefan Leupold^(a)

^(a) Uppsala University

The vector-meson dominance (VMD) assumption works very well for some reactions like the pion form factor (virtual photon coupled to two pions) and the pion transition form factor (pion coupled to two real or virtual photons), but fails badly for the omega transition form factor (omega coupled to pion and virtual photon) [1]. Starting from a simple chiral Lagrangian for pions, rho and omega mesons [2] I demonstrate that one can reproduce at the same time the agreement with VMD for the pion form factors [3] and the deviation from VMD for the omega form factor [4]. In addition, also the decay width of the omega to three pions is described well [5]. I will also point out that a thorough understanding of these hadronic processes is mandatory for hadronic calculations for processes which are sensitive to physics beyond the standard model, like the magnetic moment of the muon or the direct dilepton decay of the pion.

[1] NA60 Collaboration (Arnaldi, R. et al.), Phys. Lett. B677, 260 (2009)

[2] M.F.M. Lutz and S. Leupold, Nucl.Phys. A813, 96 (2008)

[3] S. Leupold, Phys. Rev. D80, 114012 (2009)

[4] C. Terschlüsen and S. Leupold, Phys. Lett. B691, 191 (2010)

[5] S. Leupold and M.F.M. Lutz, Eur. Phys. J. A39, 205 (2009)

E-mail: stefan.leupold@physics.uu.se