Erratum: Coupled-channel analysis for ϕ photoproduction with $\Lambda(1520)$ [Phys. Rev. C 80, 035201 (2009)]

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In Eq. (3) of Ref. [1] the Pomeron amplitude has been taken as purely real, which is inconsistent with that of the original Donachie-Landshoff (DL) model [2], where the Pomeron contribution is purely imaginary because at sufficiently high energies it corresponds to cut-multigluon exchange in the t channel [3], a statistical ensemble of inelastic channels. At lower energies, where the phase space to inelastic channels decreases, a possible Pomeron-like contribution tends to be real [4], which is the reason that in Ref. [1] we have taken this choice, however, without drawing special attention to it. For this reason we present here in this erratum also the results of a calculation in which the Pomeron contribution is taken as fully imaginary, in line with the DL model and the Pomeron used in Ref. [5].

Using the DL-Pomeron amplitude, Eq. (3) of Ref. [1] should be modified to read

$$\mathcal{M} = -\bar{u}(p_{N_f})\mathcal{M}_{\mu\nu}u(p_{N_i})\epsilon_\phi^{*\mu}\epsilon_\gamma^{\nu}, \tag{1}$$

which differs by a factor i from the original. We have repeated our calculation for this choice and found that the physics conclusions do not change significantly.

Because the interference effects have changed from those in the previous calculation, we refit the parameters for the Pomeron and for the resonance. The Pemeron parameters are slightly changed to $\beta_s = 1.51$ and $a_N = 3$, and the refitting parameters of the resonance are summarized in Table I. For the case of $g_\phi = -4.7$, we could not reproduce experimental data; thus, we focus on the results for $g_\phi = +4.7$. The resulting differential cross sections are shown in Fig. 1 as functions of the photon energy. We also show t dependence in Fig. 2 and spin-density matrices in Fig. 3.

The phase of the amplitude is very important and its relevance in the K-matrix formulation is now being investigated.

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TABLE I. Resonance parameters.

g_ϕ	$g_{K\Lambda(1520)R}$	$\kappa_{\phi NR}$	M_R (GeV)
+4.7	−5.48	0.05	2.26

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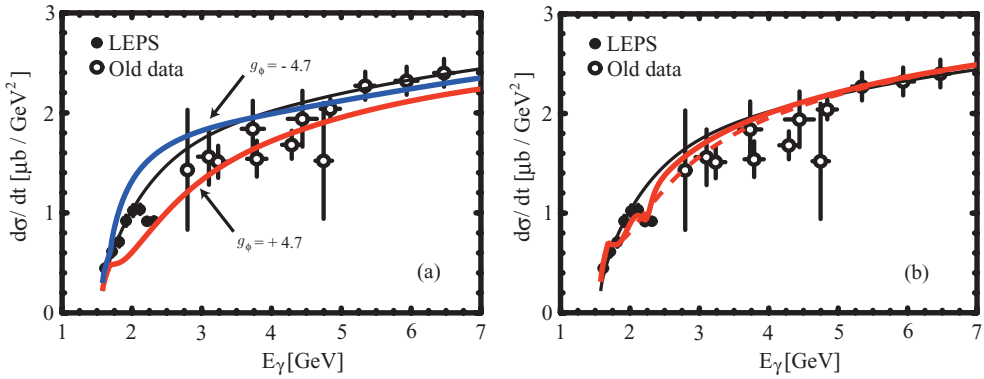

FIG. 1. (Color online) Differential ϕ-meson photoproduction cross sections at zero degrees. The thin solid line shows the results of tree-level calculation, including the Pomeron contribution. In (a) the arrows indicate the curves showing the full coupled-channel results with $g_\phi = +4.7$ and $g_\phi = -4.7$. Panel (b) shows the effect of a spin-$1/2^-$ N^* resonance. The thick solid lines shows the result of set A. The dotted line denotes the coupled-channel calculations without the resonance and with refitting the Pomeron parameters.

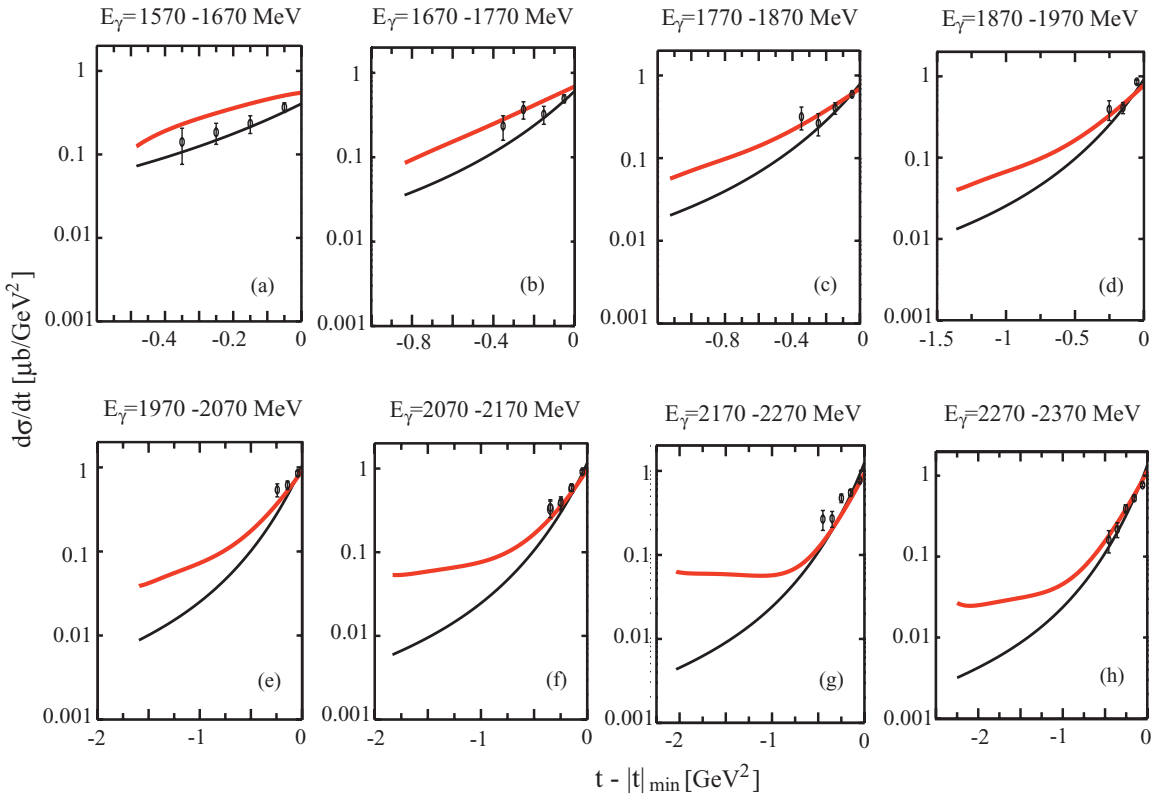

FIG. 2. (Color online) The t dependence of the cross section at various photon energies E_γ as indicated above each panel (a)–(h). The black line is the tree level result and the red line is result of set A.

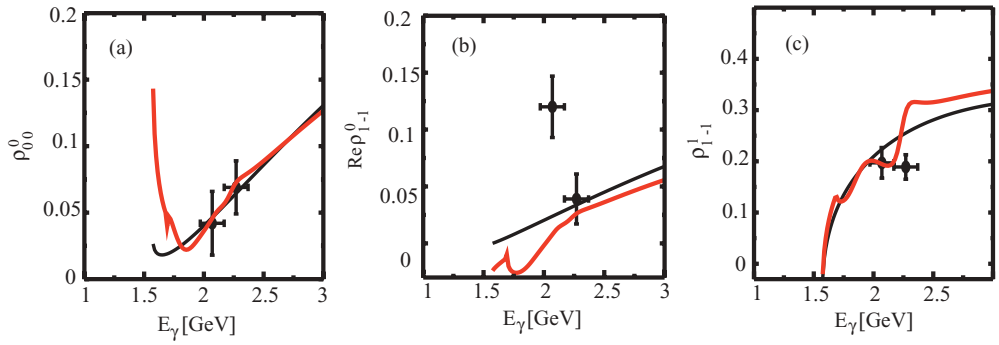

FIG. 3. (Color online) The spin-density matrix for ϕ-meson photoproduction as a function of the photon energy in the GJ system: (a) ρ^0_{00}, (b) $\rho^0_{1\text{-}1}$, (c) $\rho^1_{1\text{-}1}$. In the calculation the ϕ-meson angle is fixed at $\theta = 20^\circ$. The black line is the tree level results and the red line is result of set A.

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