Contribution of $N^*$ and $\Delta^*$ resonances to $K^*\Sigma(1189)$ photoproduction

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We investigate the photoproduction of $K^*0\Sigma^+$ and $K^+\Sigma^0$ off the proton target with an effective Lagrangian method via the tree-level Born approximation. The background production mechanisms include $K^*$, $K$, and $\kappa$ exchanges in the $t$ channel, $N$ and $\Delta(1232)$ in the $s$ channel, and $\Lambda$, $\Sigma$, and $\Sigma^*$ hyperons in the $u$ channel. In order to improve the previous theoretical studies for the present reaction process [1], we also consider the following $N^*$ and $\Delta^*$ resonance contributions in the vicinity of the reaction threshold: $D_{13}(2080)$, $S_{11}(2090)$, $G_{17}(2190)$, $D_{15}(2200)$, $S_{31}(2150)$, $G_{37}(2200)$, and $F_{37}(2390)$. Taking into account the internal structure of the hadrons involved, the phenomenological form factors are employed for the interaction vertices, conserving the gauge invariance of the scattering amplitude. Physical inputs for those resonances, such as the strong and electromagnetic couplings are determined by available experimental and theoretical information [2-4]. The total and differential cross section data are reproduced qualitatively well in the present model [5, 6]. It also turns out that the contributions from those $N^*$ and $\Delta^*$ resonances are almost negligible.