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DK and $D^* K$ scattering near threshold

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We study the three D_s quantum channels $J^P = 0^+, 1^+$ and 2^+ where experiments have identified the charm-strange states $D_{s0}(2317)$, $D_{s1}(2460)$, $D_{s1}(2536)$ near the DK and DK thresholds, and $D_{s2}(2573)$. We consider correlation functions for sets of $q\bar{q}$ operators and, for $J^P = 0^+, 1^+$, also the DK and DK meson-meson interpolators and determine for these cases values of the elastic scattering amplitude. Constructing the full set of correlators requires propagators which connect any pair of lattice sites. For one ensemble of gauge configurations ($32^3 \times 64$, $m_\pi = 156$ MeV) a stochastic distillation variant is employed and for another ensemble ($16^3 \times 32$, $m_\pi = 266$ MeV) we use the full distillation method. Both, $D_{s0}(2317)$ and $D_{s1}(2460)$, are found as bound states below threshold, whereas $D_{s1}(2536)$, and $D_{s2}(2573)$ are identified as narrow resonances close to the experimental masses.

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