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Distinguishing weak and strong symmetry-protected topological phases in deformed AKLT states KEVIN BEACH, KEOLA WIERSCHEM, The University of Mississippi — The so-called "strange correlator" can be used as a tool to detect symmetry-protected topological order in one- and two-dimensional quantum systems. It takes the form of a spin-spin correlation function, computed as a mixed overlap between the state of interest and a trivial local product state. The strange correlator is computed in the featureless bulk but is sensitive to the system's edge modes and its topological character. I will discuss how one can directly evaluate the strange correlator within the valence bond loop gas framework and give some numerical examples of applications to various Affleck-Kennedy-Lieb-Tasaki (AKLT) states. This approach reproduces the predicted even-odd effect in the spin value S for the linear-chain and square-lattice AKLT states (in accordance with the Haldane conjecture). Moreover, changes in the strange correlator's asymptotic form in response to deformation of the wave function reveal the robustness of the protecting symmetries and allow for their categorization as either weak or strong.

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