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**t-J model on the Shastry-Sutherland lattice** Y. F. CHENG, P. W. LEUNG, Hong Kong University of Science and Technology — The spin-1/2 Heisenberg model on the Shastry Sutherland (SS) lattice is a frustrated system that has a spin gap state. Our previous study has shown that the  $t$ - $J$  model on the SS lattice does not exhibit hole-pairing when the diagonal hopping term  $t'$  is positive.[Phys.Rev.B**69**, 180403 (2004)]. It demonstrates that the existence of a spin gap does not necessarily lead to hole pairing. In this project, we investigate the case where  $t'$  is negative. The method we use is numerical diagonalization on a 32-site SS lattice with periodic boundary conditions. Our result shows that in the present case the distortion on the spin background due to a mobile hole is different from the previous case where  $t'$  is positive. The frustration due to hopping motion of the hole does not favor dimerized spin order which exists at half-filling. As a result, other spin orders competing with the dimerized spin order may be enhanced. We will also study the possibility of hole-pairing in the present case.

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