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Quantum dimer model on a two dimensional pyramid lattice. HONG YAO, Department of Physics, Stanford University, CA 94305, HANDONG CHEN, Department of Physics, Uiversity of Illinois, Urbana-Champaign, IL 61801, CONGJUN WU, Kavli Institute for Theoretical Physics, University of California, Santa Barbara, CA 93106 — We study the Rokhsar-Kivelson (RK) quantum dimer model on a two dimensional corner-sharing pyramid lattice. Contrast to other lattices such as square and triangular lattice, on the RK line (V=t, V' arbitrary), the dimer-dimer correlation is exact zero as long as dimers are a few lattice constants away from each other. More interestingly, a deconfined dimer liquid phase (or RVB phase) is found to the left of the RK line in the phase diagram. There are two kinds of confined valence bond crystal (VBC) states to the very left of the RVB phase. And there is a VBC state to the right of the RK line. Surprisingly, the spinor excitations are deconfined within the model even though the underlining state breaks the translational symmetry and rotational symmetry.

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