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Shastry-Sutherland tube in a magnetic field SALVATORE R. MANMANA, JEAN-DAVID PICON, ITP, EPF Lausanne, Switzerland, KAI P. SCHMIDT, ITP 1, TU Dortmund, Germany, FRÉDÉRIC MILA, ITP, EPF Lausanne, Switzerland — We study a peculiar quasi-1D version of the 2D Shastry-Sutherland lattice, namely a spin tube made of two coupled orthogonal dimer chains with periodic boundary conditions in the transverse direction. The phase diagram is obtained at zero and at finite magnetic fields combining DMRG and PCUTs approaches. In the limit of small inter-dimer interactions J' and below half the saturation value an infinite sequence of fractional plateaux is identified with the first few ones located at 1/6, 1/4, 1/3, and 3/8. Above, a pronounced plateau at 1/2 and a smaller one at 3/4 are found. In the limit of large J' the system behaves as a Heisenberg spin-1 chain. At intermediate couplings ($0.65 \leq J' \leq 0.7$) a new plateau at 1/5 is realized whose structure cannot be understood in terms of individual triplet coverings of the dimers. We discuss possible implications for the 2D case and ongoing experiments on the plateau-material $SrCu_2(BO_3)_2$.

Salvatore R. Manmana
ITP, EPF Lausanne, Switzerland

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