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High Resolution Neutron Scattering Studies of Spin Excitations in the 2D Singlet Ground State Systems of SrCu2(BO3)2, SrCu(2-x)Mg(x)(BO3)2 and Sr(1-x)La(x)Cu2(BO3)2. SARA HARAVIFARD, SARAH DUNSIGER, BRUCE GAULIN, HANNA DABKOWSKA, Department of Physics and Astronomy, McMaster University, Hamilton, ON, Canada., MARK TELLING, TOBY PERRING, Rutherford Appleton Laboratory, ISIS Pulsed Neutron Facility, Didcot, Oxon, United Kingdom., SAMIR EL SHAWISH, J. Stefan Institute, Ljubljana, Slovenia. , JANEZ BONCA, Faculty of Mathematics and Physics, University of Ljubljana, Ljubljana, Slovenia. — SrCu2(BO3)2 is a quasi-2D quantum spin system known to possess a collective singlet ground state and a realization of the Shastry-Suthrland model. One aspect of the study of SrCu2(BO3)2 for which there is a little information is the influence of impurities on the nature of the singlet ground state. There is much interest in such studies due to the remarkable phenomena associated with doping other quasi-2D copper-oxide quantum magnets with high-T superconductivity. Here we report high resolution time-of-flight neutron scattering studies of single crystals of doped SrCu(2-x)Mg(x)(BO3)2 and Sr(1-x)La(x)Cu2(BO3) 2 and compare these results to the pure SrCu2(BO3)2 neutron scattering measurements. Particular emphasis is placed on the lifetimes of one-triplet excitations as well as the existence of in-gap spin excitations in the presence of Mg and La impurities.

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