NMR studies of quantum spin liquids using high magnetic fields: SrCu$_2$(BO$_3$)$_2$ and BaCuSi$_2$O$_6$\cite{1} RAIVO STERN, I. HEINMAA, NICPB, Akadeemia tee 23, EE12618 Tallinn, Estonia, P. KUHNS, A. REYES, W. MOULTON, NHMFL, 1800 East Paul Dirac Dr., Tallahassee, FL 32310, M. HORVATIC, C. BERTHIER, GHMFL-CNRS, 25 Avenue des Martyrs, F38042 Grenoble Cedex 9, France, C. BATISTA, M. JAIME, T. KIMURA, NHMFL-LANL, Los Alamos, NM 87544, H. DABKOWSKA, B. D. GAULIN, Dept of Physics and Astronomy, McMaster University, Hamilton, Canada — We present the results of Nuclear Magnetic Resonance (NMR) experiments on the quasi-2D spin gap systems SrCu$_2$(BO$_3$)$_2$ and BaCuSi$_2$O$_6$ in continuous magnetic fields $H$ of up to 44 T. Using $^{11}$B spectra and spin-lattice relaxation times $T_1$ we explore the spin structure on the so-called 1/3 magnetization plateau of the Shastry-Sutherland model material SrCu$_2$(BO$_3$)$_2$. In ancient Han purple - BaCuSi$_2$O$_6$ – we observe with help of $^{29}$Si and $^{63,65}$Cu $T_1$ the closure of the singlet gap at $H_{c1} = 23.4$ T down to temperatures $T \sim 40$ mK. While entering the suggested Bose-Einstein Condensate phase for higher fields [M. Jaime et al., Phys. Rev. Lett, 93, 087203 (2004)] we discover dramatic changes in $^{29}$Si line shape suggesting incommensurate (and complicated) spin modulation in the ordered phase.

\cite{1}work in Tallinn was supported by the Estonian Science Foundation grant 4931

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Date submitted: 01 Dec 2004

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