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The Angular Dependent Magnetic Phase Diagram of Cs₂CuCl₄¹ SCOTT T. HANNAHS, National High Magnetic Field Lab, Tallahassee, FL, NATHANAEL FORTUNE, Department of Physics, Smith College, Northampton, MA, YASUMASA TAKANO, Department of Physics, University of Florida, Gainesville, FL, TOSHIO ONO, Department of Physics, Osaka Prefecture University, Osaka, HIDEKAZU TANAKA, Department of Physics, Tokyo Institute of Technology, Meguro-ku, Tokyo — We present a determination of the phase diagram of the $S = \frac{1}{2}$ quasi-2D triangular Heisenberg quantum antiferromagnet Cs₂CuCl₄ at temperatures to down 100mK and fields up to the saturation field of 9 tesla. We have determined the low temperature phase boundaries as a function of angle to the magnetic field using a unique low temperature rotatable calorimeter. Measurements at several angles intermediate to the in-plane and perpendicular directions elucidate the evolution of the complex phase diagram between these two principal axis. For fields directed along the a-axis (perpendicular to the plane of the triangular lattice), we observe a series of magnetic phases. New, unexpected phases arise at intermediate angles as we rotate the magnetic field away from the a-axis, into the bc plane. Variation of phase boundaries with field angle within the bc plane reflect interactions due to the Dzyaloshinskii-Moriya mechanism.

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> Scott Hannahs National High Magnetic Field Lab, Tallahassee, FL

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