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Synthesis and Observation of 2-Dimensional Frustration in a Tripod Kagome Lattice. KYLE NOORDHOEK, JIAN LIU, Univ of Tennessee, Knoxville — Magnetic frustration is an important phenomenon that challenge the fundamental theory of how spins should be aligned in a crystal lattice structure. To study this phenomenon further, our group plans to synthesize a newer family of compounds that exhibit frustration in a tripod kagome lattice. This lattice is comprised of a repeating pattern of corner sharing triangles that is difficult to produce in a laboratory setting and more difficult to find in the natural world. However recently, a compound that exhibits this kind of frustrated lattice has been synthesized. While interesting magnetic properties are seen in polycrystalline samples, a single crystalline sample is necessary for fully exploiting the two-dimensional magnetic interactions. Thus, we explore the possibility of growing epitaxial thin films and heterostructures by Pulsed Laser Deposition (PLD). To begin, we will first be growing a layer of (YTO) onto a Yttria-Stabilized Zirconia (YSZ) substrate. We have experimented with this growth already using a range of temperatures above 700C, only after having treated the YSZ substrates. In addition to these beginning growths, we have also begun treatment of the YTO crystal which involves the polishing of the crystal with a specialized lubricant. This is done to produce the flattest possible surface in which we can grow our final film on. Lastly, we have been able to calculate the lattice parameter of the corresponding YTO crystal. Throughout the processes, the topography of the samples is being monitored using the Atomic Force Microscope (AFM) while the phase is monitored using X-ray Powder Diffraction (XRD).

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