

Abstract Submitted
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Growth of Superconducting Bulk Single Crystals and their use in Levitation Demonstrations¹ A. KOTLYAREVSKY, M.C. SULLIVAN, Department of Physics, Ithaca College, Ithaca NY, J. HUNTING, Department of Chemistry, Ithaca College, Ithaca NY — We present our work on the growth of bulk single-crystal $\text{YBa}_2\text{Cu}_3\text{O}_7$ and a novel superconducting demonstration using our superconductors. We report the first successful fabrication at the undergraduate level of $\text{YBa}_2\text{Cu}_3\text{O}_7$ superconducting pucks with enhanced flux-pinning properties. We follow a bulk superconductor growth recipe developed by Dr. Kazumasa Iida at the Institute for Metallic Materials in Dresden, Germany. In order to grow a puck that is largely single crystalline in phase, it is necessary to mix portions of both superconducting ($\text{YBa}_2\text{Cu}_3\text{O}_7$) and non-superconducting (Y_2BaCuO_5) phases together and fire them at near liquefying temperatures. This process is known as melt-textured growth. We have also constructed a figure-8 track of strong permanent NdFeB magnets to demonstrate the dramatic effect of flux-pinning. This track is outfitted with an accelerator to keep the puck circling the track. We accelerate the puck to a speed that, without the introduction of enhanced flux-pinning, would cause the puck to be thrown from the track. We will show a video of our puck and novel demonstration.

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