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Domain Mapping of a Ca-doped Manganite JOSHUA TURNER, University of Oregon, K. JESSICA THOMAS, MARY UPTON, JOHN HILL, Brookhaven National Laboratory, JEAN JORDAN-SWEET, National Synchrotron Light Source, YOSHINORI TOKURA, YASUHIDE TOMIOKA, Correlated Electron Research Center, STEPHEN KEVAN, University of Oregon — In the last few years, disorder has emerged as a key without which the colossal magnetoresistance (CMR) effect would not exist. Single crystals represent the simplest arenas to observe and study the peculiarities central to the manganites. This is in contrast to polycrystalline compositions for instance, where rampant strain fields can veil fundamental physics. By micro-focusing x-rays through a glass capillary, we have performed a microtopography technique to map the crystallographic domain structure of the Ca-doped manganite crystal, PCMO. This technique serves as a domain-mapping alternative tool to TEM that does not require challenging sample preparation procedures. Surprisingly, we find micron size domain structure. We suggest that the separation of crystallographic domains by twin boundaries is more relevant than previously believed. These boundaries could affect the large-scale, sub-micron size disorder that has been observed recently, and also may play a role in the heterogeneous nature of the CMR effect.

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