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Piezomagnetism in Epitaxial Cr_2O_3 Thin Films[1] YI WANG, SARBESWAR SAHOO, CHRISTIAN BINEK, University of Nebraska-Lincoln, BINEK TEAM — Recently, the magnetoelectric material Cr_2O_3 attracted renewed interest due to its potential for future spintronics applications which can be realized by novel magnetic thin film heterostructures [1]. Here we study thin films of Cr_2O_3 (111) on c-Al_2O_3 (111) substrate which are grown by thermal evaporation of Cr metal in an O_2 atmosphere. X-ray diffraction data reveal stoichiometric epitaxially grown Cr_2O_3 (111) films. Owing to a lattice mismatch of $\sim$4% at the interface between the Al_2O_3substrate and the film we observe a strong stress induced piezomagnetic moment in the Cr_2O_3 film. We measure the temperature dependence of this piezomoment by Superconducting Quantum Interference Device (SQUID) magnetometry and Kerr rotation. The presence of high inherent stress, a significant piezomagnetic moment and the possibility to realize high electric fields makes our Cr_2O_3 thin films ideal candidates for the challenging quest of the symmetry allowed but hitherto undiscovered piezomagnetoelectric effect. [1] Ch. Binek, B. Doudin, J. Phys. Condens. Matter **17**, L39 (2005).

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Christian Binek
University of Nebraska-Lincoln

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