

Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

CMR Manganite Sensors for Total Energy Measurements of the Linear Coherent Light Source Pulsed X-ray Laser RAJESWARI M. KOLAGANI¹, G.J. YONG, D.E. COX, R. MUNDLE, A. DAVIDSON III, V.N. SMOLYANINOVA, E. TALANOVA, D. SCHAEFER, Towson University, S. FRIEDRICH, O. DRURY, Z. ALI, L. LI, L. OTT, Lawrence Livermore National Labs, L. YONG, Motorola Labs, TOWSON UNIVERSITY TEAM, LAWRENCE LIVERMORE NATIONAL LABORATORY TEAM, MOTOROLA LABS COLLABORATION — We are developing CMR manganite thin film bolometric sensors for total energy measurements of the Linear Coherent Light Source (LCLS) pulsed free electron x-ray laser (FEL). This application requires the sensor array to be fabricated on a low Z substrate capable of withstanding the pulse impact of 2 mJ in ~ 200 femtoseconds, without the thermal expansion exceeding the yield strength, when the back side of the substrate is irradiated. Si is a potential candidate for meeting this requirement though its stability for long term exposure is a concern that needs to be tested. Optimal operating temperature of the sensor is estimated to be ~ 100 K-200 K, based on finite element simulations of the temperature evolution in the sensor pixel. Our initial work has identified $\text{Nd}_{1-x}\text{Sr}_x\text{MnO}_3$ as the manganite material suitable for the LCLS sensor. We will present our materials development efforts towards LCLS sensor design as well as simulations of the sensor response.

¹formerly M.Rajeswari

Rajeswari Kolagani
Towson University

Date submitted: 11 Jan 2006

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