"Multi-Absorber Transition-Edge Sensors for X-ray Astronomy Applications"

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We are developing multi-absorber Transition-Edge Sensors (TESs) for applications in x-ray astronomy. These position-sensitive devices consist of multiple x-ray absorbers each with a different thermal coupling to a single readout TES. Heat diffusion between the absorbers and the TES gives rise to a characteristic pulse shape corresponding to each absorber element and enables position discrimination. The development of these detectors is motivated by a desire to maximize focal plane arrays with the fewest number of readout channels. In this contribution we report on the first results from devices consisting of nine, 65´65 microns^2 Au x-ray absorbers, 5 microns thick. These are coupled to a single 35´35 microns^2 Mo/Au bilayer TES. These devices have demonstrated full-width-half-maximum (FWHM) energy resolution of
2.1 eV at 1.5 keV, 2.5 eV at 5.9 keV and 3.3 eV at 8 keV. This is coupled with position discrimination from pulse shape over the same energy range. We use a finite-element model to reproduce the measured pulse shapes and investigate the detector non-linearity with energy, which impacts on the devices position sensitivity and energy resolution.