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eLeNA: A Parametric CMOS Active Pixel Sensor for the evaluation of noise reduction architectures

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We present a parametric CMOS Active Pixel Pixel for the evaluation of noise reduction architectures. The sensor is called e-Le-NA, which stands for Low Noise Active pixel sensor. It consists of fourteen different arrays for characterising and investigating method to reduce the noise in an image sensor. In a MAPS, the dominant source of noise is the reset noise. A conventional technique is to apply a Correlated Doubling Sampling (CDS). For MAPS, other techniques are also envisaged, based on performing the reset in an actively controlled way, hence their collective name as 'active reset'. This sensor includes architectures for both CDS and active reset. The goal is to achieve sub 10 e- rms and we will present preliminary results. The sensor was designed and manufactured in the novel 0.18 \vee mcMOS Image Sensor process INMAPS, which includes a special deep P-well module for enhanced imaging performance and was developed by RAL. The sensor has 512 x 448 pixels at 15 um pitch, the die is 8 mm x 9.1 mm and it was manufactured with two epitaxial layer thicknesses, of 5 and 12 um.

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