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(54) **SENSOR MODULE FOR SCANNING ELECTRON MICROSCOPY APPLICATIONS**

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(57) **ABSTRACT**

A scanning electron microscopy (SEM) system is disclosed. The SEM system includes an electron source configured to generate an electron beam and a set of electron optics configured to scan the electron beam across the sample and focus electrons scattered by the sample onto one or more imaging planes. The SEM system includes a first detector module positioned at the one or more imaging planes, wherein the first detector module includes a multipixel solid-state sensor configured to convert scattered particles, such as electrons and/or x-rays, from the sample into a set of equivalent signal charges. The multipixel solid-state sensor is connected to two or more Application Specific Integrated Circuits (ASICs) configured to process the set of signal charges from one or more pixels of the sensor.