Title: Innovative CMOS Image Sensors and Photonic Add-ons for Astronomy and Space Applications

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Abstract:

The French company Pyxalis has been offering off-the-shelf CMOS image sensors for several years that are well suited to astronomical applications. With strong expertise in the custom design of CMOS detectors, Pyxalis also develops advanced and unconventional sensors capable of addressing a wide range of scientific needs, including astrometry and spectroscopy. This presentation provides an overview of the company's sensor portfolio targeting such applications.

In addition to large-format devices such as those from the GIGAPYX family, Pyxalis offers lower-resolution sensors from the HDPYX range, featuring large pixel pitches (10 µm), low dark current, and low readout noise. These characteristics ensure high detection efficiency and excellent signal-to-noise ratio. Depending on the targeted application, the presented results demonstrate that long exposure times can be achieved without the need for detector cooling.

Pyxalis also develops photonic add-ons enabling advanced functionalities, such as synchronous spectro-imaging systems capable of generating spatially resolved images with high spectral resolution. This principle has notably been implemented in the context of the AURORA AOSI project led by the European Space Agency.

Among these photonic enhancements, curved sensors are also introduced, offering opportunities for simplified optical system designs. Initial results demonstrate the feasibility of curving large-format detectors while maintaining performance.

Finally, for spaceborne applications, Pyxalis provides radiation-hardened sensors as well as devices that have undergone extensive irradiation testing, including total ionizing dose and heavy ion exposure.