

# Curved Sensors for Ultraviolet Aurora Monitoring from Space

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Abstract:

For two years, the European Space Agency investigates a concept mission called Wide Field Auroral Imager (WFAI) to observe Aurora from space and correlate the results of the observations with the solar activity. Two imagers are considered, one in the visible spectrum, and one called Auroral Ultraviolet Imager (AUI) in far-ultraviolet. My PhD research was focused on AUI, following 2 main axes of development:

- Design a compact wide field imaging system
- Curve and test CMOS sensors

Regarding the footprint constraint, we opted for a transmissive optical system. The first main constraint in FUV is to get high transmissive optics. To increase the signal, the number of optical elements must be reduced. However, reducing the number of optical elements means reducing the number of degrees of freedom to correct the aberrations of such a wide-field system. To address this problem, curved sensors are explored to design compact camera. This technology enables a substantial simplification of optical systems and significant improvement of image quality. The field curvature, particularly visible in wide-angle imaging is directly corrected in the focal surface.

In this talk I will present the results of the parametric study regarding the contribution of sensors with spherical and aspherical shapes on AUI's requirements. Using this type of sensor allows to increase the SNR of the system by a factor of 2 compared to traditional flat-sensor imagers. Then I will present the first curved sensors prototypes developed in the frame of AUI project.

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