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PHOTONICS spectra

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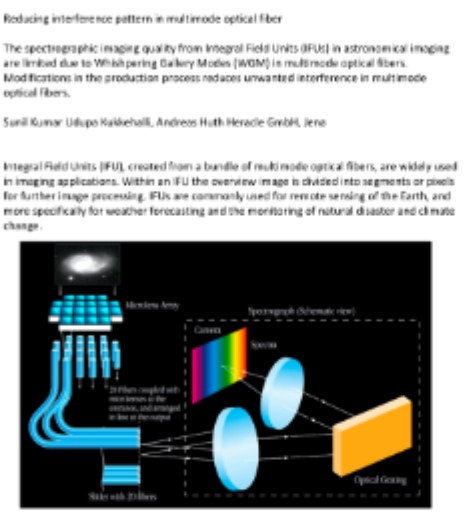

Reducing interference pattern in multimode optical fiber

The spectrographic imaging quality from Integral Field Units (IFUs) in astronomical imaging are limited due to Whisbpering Gallery Modes (WGM) in multimode optical fibers. Modifications in the production process reduces unwanted interference in multimode optical fibers.

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Integral Field Units (IFU), created from a bundle of multimode optical fibers, are widely used in imaging applications. Within an IFU the overview image is divided into segments or pixels for further image processing. IFUs are commonly used for remote sensing of the Earth, and more specifically for weather forecasting and the monitoring of natural disaster and climate change.

Figure 1: An illustration of how the IFUs function [3].

In combination with spectroscopy, IFU is known as Integral Field Spectroscopy (IFS) and used in astronomy for studying extended objects, such as nebulas, galaxies or crowded clusters in one shot. This method generates a spectrum for every single pixel or segment of the image. The resulting spectra are organized into a datacube which contains the 2D viewing field and the spectra as third dimension. For example, in distant movement, astronomers can use an abundance of information from such integral field spectrograms.

Here the IFU consists of a microlens array that collects the light from a small sky area, normally centred on a celestial object (e.g., a distant galaxy) and each microlens sends the light via fiber to the entry of the spectrograph (inside the dotted box). The position of the fibers has a significant impact on the output spectrum. When a fiber is bent, there will be

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