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Integral Field Units (IFU) for AO focal plane: the case study of ELVIS, the new IFU for SHARK-VIS

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ELVIS (Exoplanets at LBT with a Visible IFS for Shark-vis) is an add-on Integral Field Unit (IFU) to be integrated in the new LBT high-contrast high-resolution AO-assisted imager SHARK-VIS. The spectrograph, which provides a spectral resolution of 10-20k at H-alpha is fed by fiber bundles with at least 12x12 spaxels. This configuration, thanks to an optimized VPH dispersing element designed and made in INAF, allows for a very compact design that can be housed in a 19"rack unit. The preliminary optical design of this spectrograph, based on spherical lenses, is diffraction limited on the operational spectral range. Here we present different optical solutions we have investigated to increase the efficiency of the fiber bundle, comparing different approaches such as direct light injection, lenslet arrays or BIGRE arrays. Finally, we show preliminary results of laboratory tests for the proposed solutions with comparative tests between fiber IFU technologies and the alternative approach with a direct BIGRE focal plane segmentation.

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