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Final performance of SPHERE/IRDIS in laboratory

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IRDIS is the dual-band imager and spectrograph of VLT/SPHERE dedicated to the detection and characterization of giant gaseous exoplanets at large orbital radii with high-contrast direct imaging. It offers a unique set of observing modes including dual-band imaging (DBI) with very low differential aberrations, long slit spectroscopy (LSS) coupled with a classical Lyot coronograph at low (R = ~50) and medium (R = ~500) resolution, and dual-polarimetry imaging (DPI). IRDIS is currently being tested in laboratory in realistic conditions with the SPHERE extreme adaptive optic system and all of the instrument common path optics before being shipped to Chile for final integration at the VLT. We present an exhaustive overview of the performance of IRDIS in laboratory for the three main observing modes. In DBI mode, the results are representative of expected on-sky performance using a combination of spectral and simulated angular differential imaging to attenuate the speckle noise induced by the instrumental aberrations. In LSS mode we similarly use the spectral deconvolution data analysis method to attenuate the speckle noise, and in DPI mode we combine different polarizations to reach the level of high-contrast. We demonstrate that the level of performance in laboratory will allow IRDIS to fulfill its main science objectives on-sky. To conclude, we present a brief comparison of the performance with the SPHERE IFS that can be used to cover YJ-bands while IRDIS observes in H, allowing to obtain a broad coverage of the near-IR in a single shot.