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Airbox housing for Jungfrau hybrid pixel area detectors used for X-ray laser applications in vacuum

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At the European XFEL facility, the scientific instruments HED and MID deploy Jungfrau cameras for two-dimensional x-ray detection. At HED, respective diagnostics and methods aim at resolving atomic lattice structures via X-ray diffraction, laser-induced microscopic material changes such as shock-wave dynamics via X-ray imaging and small-angle x-ray scattering, or plasma temperature probing by inelastic x-ray spectroscopy. MID instrument exploits coherence of X-rays, and therefore, a windowless X-ray photon beam path all the way from the source to the sample and the detector plane is part of the instrument design. This calls for the need for a flexible mount of an area X-ray detector inside vacuum chambers. Originally designed for an in-air use at Swiss-FEL, a detector airbox housing has been designed and built to meet the requirements of in-vacuum use at the European XFEL. This poster contribution presents the housing design for a single and double module, which separates the vacuum-compatible front-end sensor from the enclosed read-out electronics board, and displays fully integrated solutions for selected x-ray diagnostics.

Footnotes

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