

Quality assessment DMD batch delivered in 2024

ALVEOLE

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Tests performed on September 11th and 13th 2024

Context

- At Alvéole we are integrating a DMD in our PRIMO system:
 - An optical box integrating a UV LED light source
 - Connected to the infinity port of an inverted widefield microscope
 - To project an image through the objective of the microscope on a sample placed at the focal plane of the objective
- The optical light path is made so that only when a mirror is ON on the DMD, the light is reflected towards the objective of the microscope

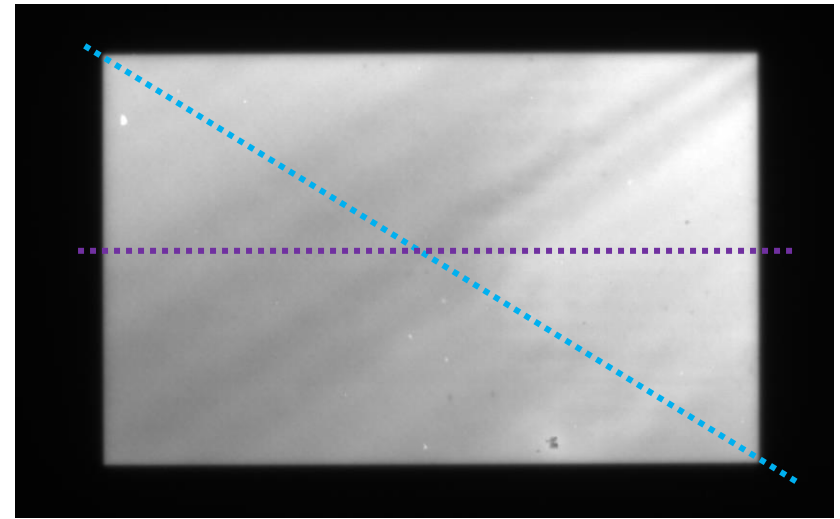
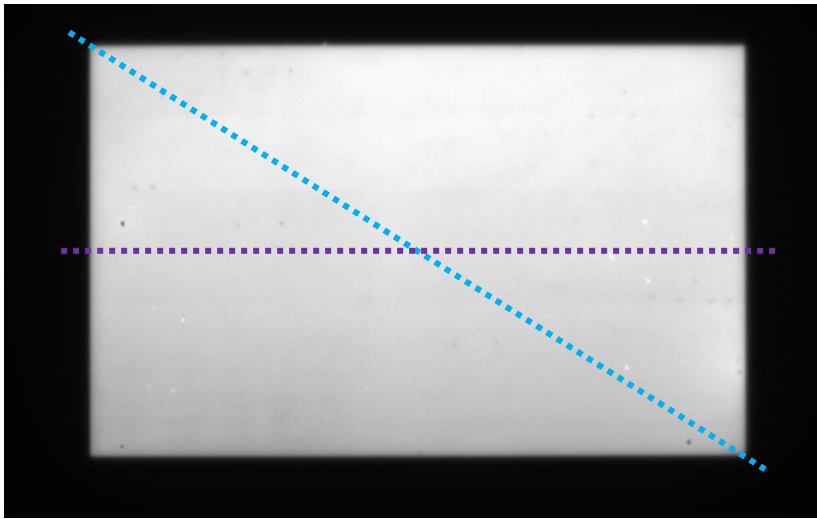
Observations

- As observed in the past 2-3 years the field of projection corresponding to a full DMD projection is not homogeneous and varying from one DMD to another. We still observe those kind of artefact with the batch of DMDs provided by Mouser in 2024

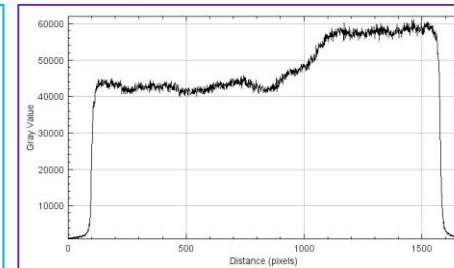
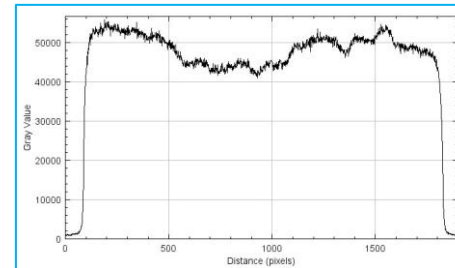
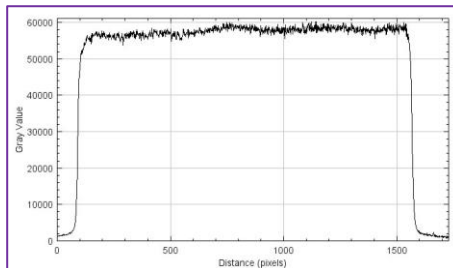
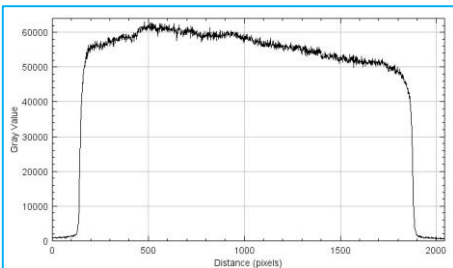
DMD projection OK

DMD projection not OK

DMD image projected on a glass coverslip stained with highlighter - image acquired with a camera



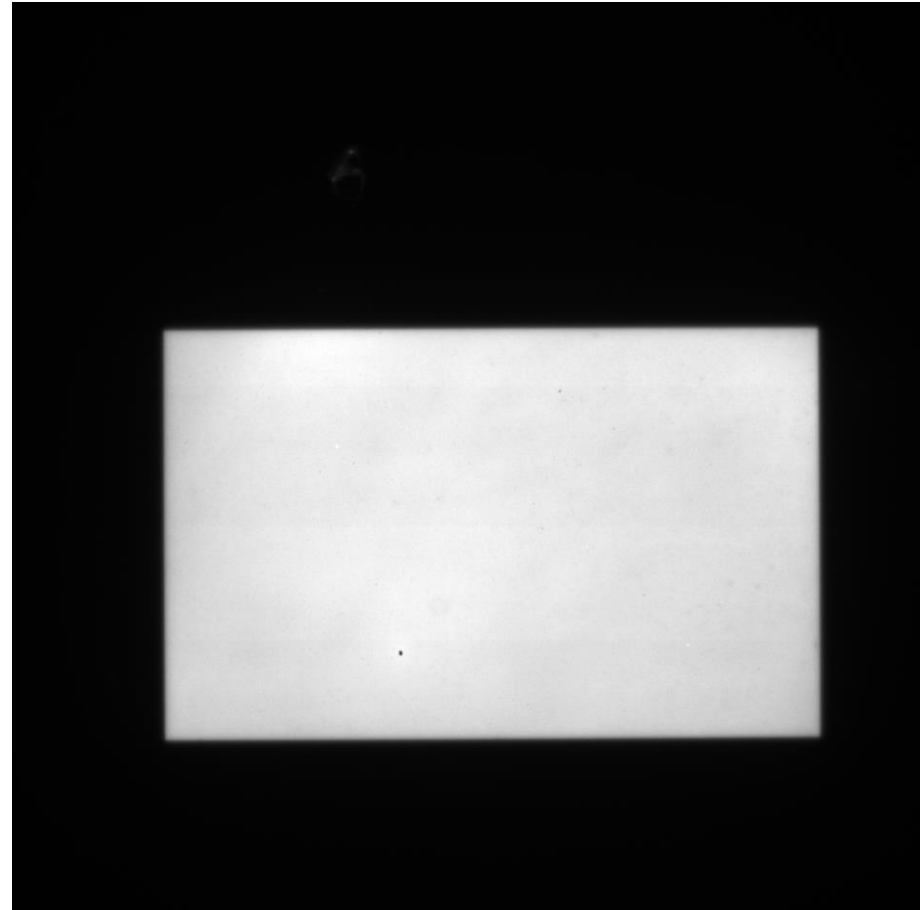
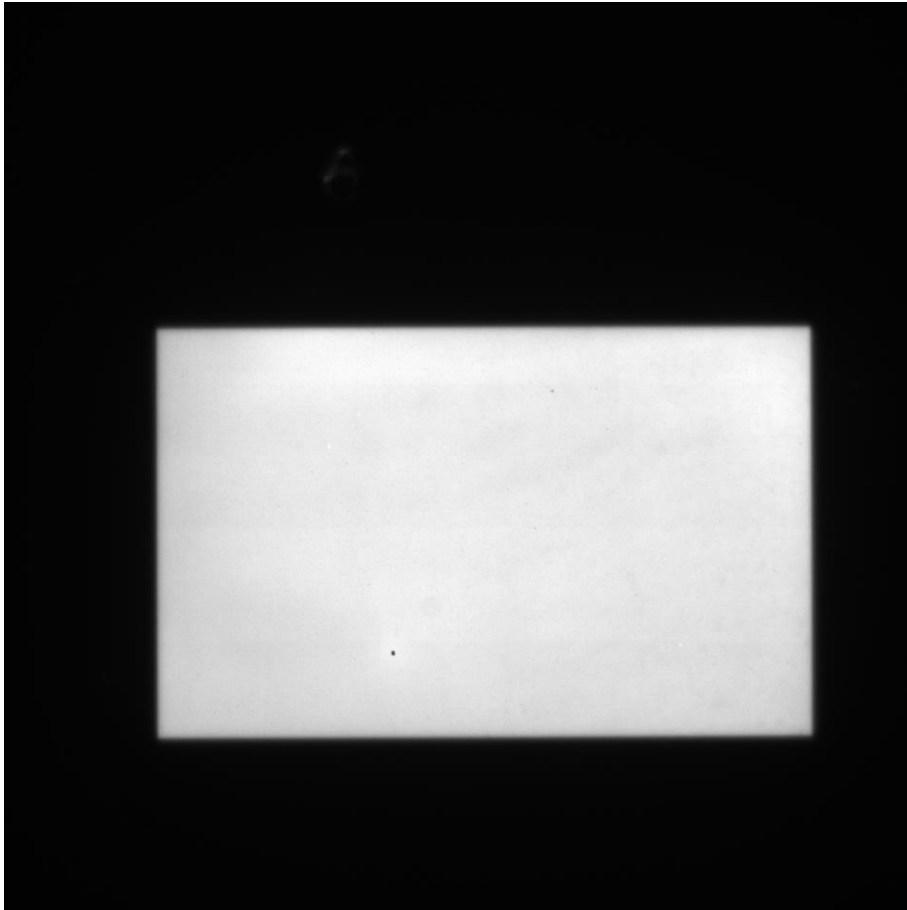
Intensity profiles along blue/purple dotted lines



Testing DMD quality – batch 2024

- To rule out the discrepancies coming from the homogeneity of the illumination by our UV LED, we tested all the DMD chips (DLP4500) received in 2024 in the same Primo unit, with the same UV LED (365 nm) module and mechanical module to integrate the DMD.
- For each DMD of the batch I performed the following operations:
 - Integration of the DMD into its mechanical module
 - Integration of the DMD module in the Primo testing unit and connection of the power supply of the DMD module (I2C cable not connected => Primo is projecting only white full DMD images)
 - Adjust position of the UV LED module to optimize power at the output of the Primo unit
 - Mounting the Primo testing unit on the microscope and connect HDMI cable
 - A coverslip stained with fluorescent highlighter is placed on the microscope
 - Projection of a white image full DMD on the coverslip with the Primo unit
 - Acquisition of an image of the fluorescence of the highlighter with a camera
- Number of DMD acceptable : 20 over 30 units tested => 66 % (See some images below)

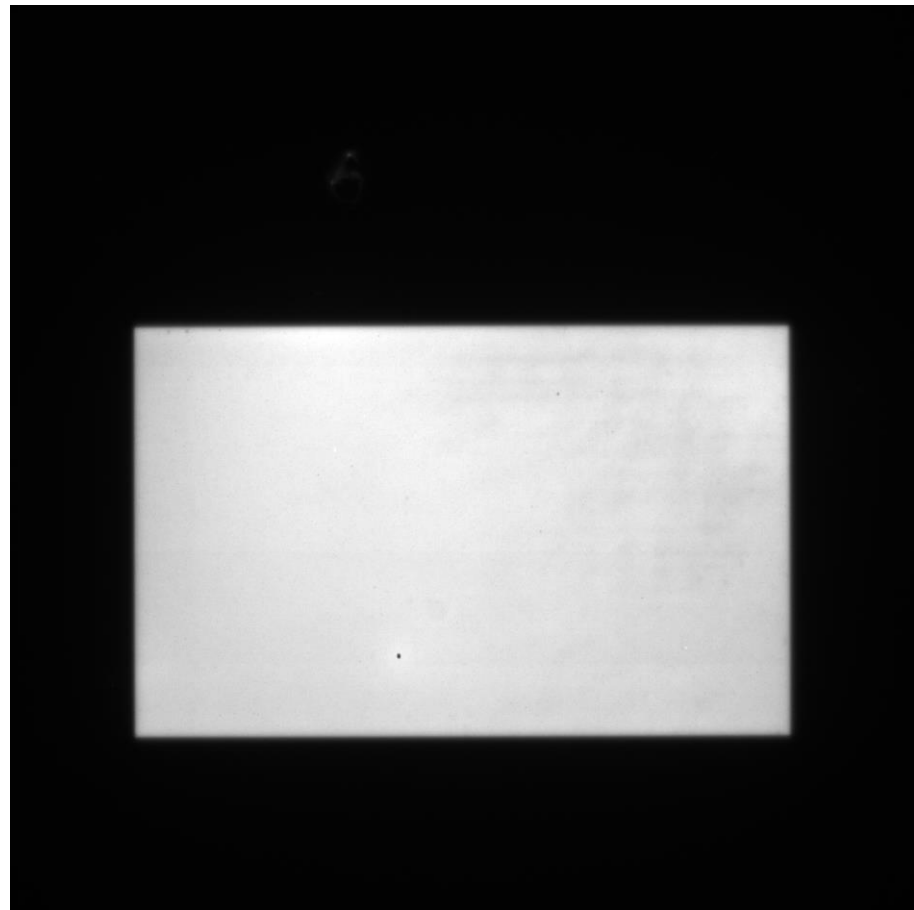
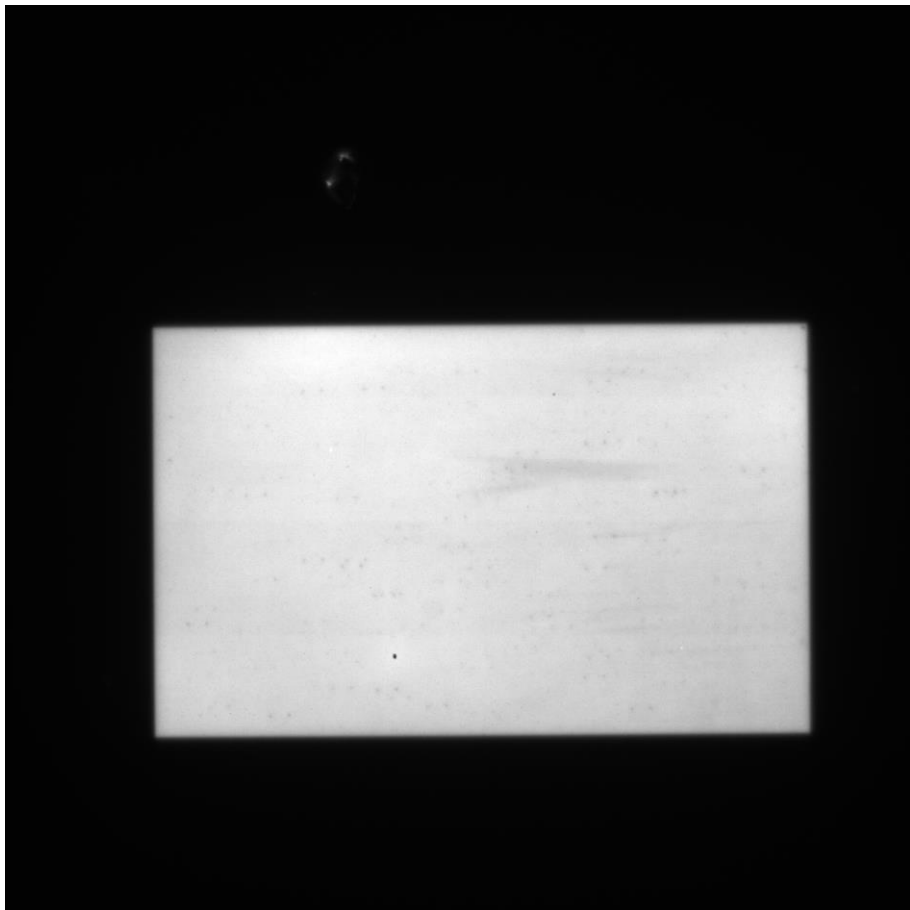
DMD chip OK



DMD chip not OK



DMD chip not OK



DMD chip not OK

