

## **Multi-plane photophoretic trapping of airborne light-absorbing particles**

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In this work, we investigate the generation of a multi-linear optical trap using the Gaussian beam diffraction on the edge of a displaced cylindrical lens and demonstrated the possibility of multi-plane photophoretic trapping of airborne light-absorbing particles. The experimental trapping results were shown by observation of light scattered by the particles trapped at different levels of the generated optical trap. The effect of the laser power level tuning on multi-plane trapping of particles was also demonstrated, confirming the assumption that initial laser power affects trapping robustness, which leads to an earlier escape of smaller particles trapped in non-main light lines. All these results were experimentally confirmed and can be used for implementation of passive sorting of particles based on their physical properties.

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