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Tomographic Laser-Doppler-Velocimetry - a new method to increase spatial resolution DIETMAR KUHN, GERALD FAST, ANDREAS G. CLASS, Forschungszentrum Karlsruhe — Laser-Doppler-Velocimetry, LDV is a common measurement principle to obtain local velocities. In most applications the finite size of the probe volume is neglected. Using a 400mm lens leads to a probe volume depth of 4mm that restricts the spatial resolution. To minimize the dimension either the intersection angle of the laser beam is increased or the laser beam is expanded. These methods often fail because of geometrical constraints, i.e. in combustion chambers, pressure chambers. In the context of theoretical considerations a tomographic algorithm is presented to increase the spatial resolution of the LDV based on the Inverse Radon Transformation. In this new approach integral information on velocity and particle density within the probe volume is analyzed to obtain sub-volume resolution. The probe volume is traversed from different viewing angles and evaluated with the presented algorithm. This leads to the two-dimensional velocity field. The new spatial resolution is mainly limited by the traverse increment. By means of an axis symmetric artificial velocity field the algorithm is verified We acknowledge the DFG for supporting this work by grant SFB- 606.

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