DGV/FRS camera module

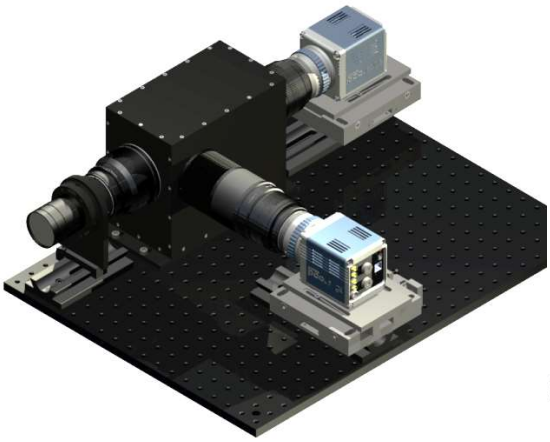

Fig.1: DGV Camera module (with optics and cameras)

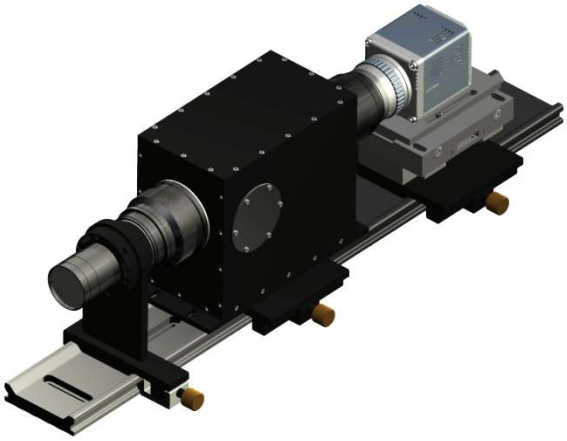

Fig. 2: FRS Camera module (with optics and camera)

Overview

The ILA R&D Camera Module is an optical system which is mainly used for the planar measurement techniques Filtered Rayleigh Scattering (FRS) and Doppler Global Velocimetry (DGV), in other sources referred to as Planar Doppler Velocimetry (PDV).

In the FRS configuration (Fig. 2), the system consists of an iodine cell heater (Fig. 5) located in the camera module, an optical setup and a camera or sensor. The iodine cell heater raises the temperature of an iodine cell to the saturation temperature when the iodine contained in the cell is completely vaporized. The observed light can thus be spectrally filtered by the absorption spectrum of the iodine cell (Fig. 6), which is unique for each cell. A suitable selection of lenses in front of and behind the camera module ensures the correct expansion and collimation of the light and correct imaging on the camera sensor. The camera is mounted on a manual stage, which allows the translatory adjustment of cameras of different sizes to the aperture of the camera module.

In the DGV configuration of the camera module (Fig. 1) a second camera with manual stage, lens and bellows is added. In addition, an optical beam splitter cube is rotatably mounted in the camera module in front of the iodine cell heater (see Fig. 4). This means that a selectable amount of the observed light can be deflected and displayed unfiltered by the second camera, e.g. for normalization.

Our camera module is customizable to meet your exact expectations. For any questions please contact ILA R&D and tell us about your needs. We will gladly discuss your application and provide more details.

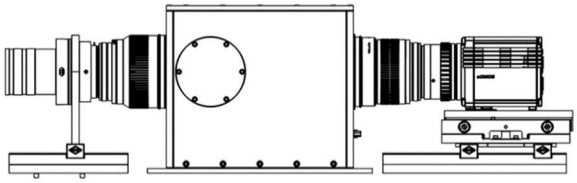

Fig. 3: FRS Camera module sketch in side view

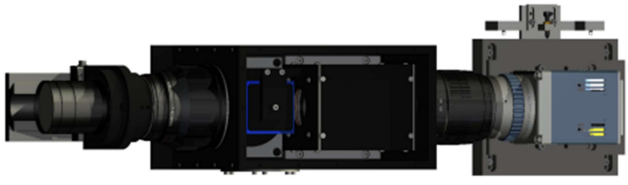

Fig. 4: Camera module with beam splitter cube

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Specifications

Vapor Cell heater

Heater Power	240 W max. at 40 V
Cell dimensions	Ø44 x 56 mm
Aperture	35 mm
Temperature sensor	PT100 1/10 Din 4W
Temperature	> 90 °C (363,15 K)
Temp. Accuracy	± 0,1 K
Dimensions	104 x 98 x 95 mm
Weight	≈ 2,4 kg

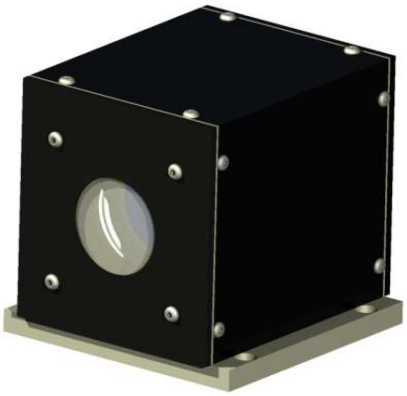

Fig. 5: Vapor cell heater

Iodine Cell

Useful diameter	36 mm
Useful cell length	50 mm
Vapor filling	Iodine (others on demand)
Saturation Temperature	25 - 70 °C (others on demand)

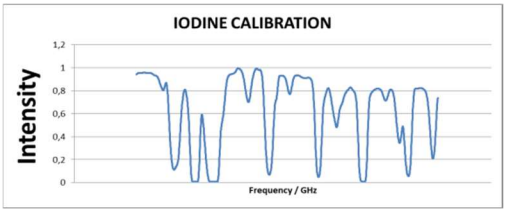

Fig. 6: Absorption spectrum of a iodine cell

Camera module (w/o optics and mounts)

Dimensions	245 x 118 x 182 mm
Weight	≈ 4,5 kg
Aperture (object side)	77 mm
Aperture (camera sides)	72mm

Temperature Controller

Channels	2
Performance	up to 240 W per channel
Connection	Ethernet (100 Mbit)
Configuration/Control	Via Software
Power supply	220...240 V, 50/60Hz
Dimensions	330 x 370 x 80 mm
Weight	4 kg

Features

- The vapor cell can be removed from the heater in a cage system, e.g. for transport
- Small wedge angles in the glasses of the iodine cell prevent direct reflection
- Optional accessories:
    - Scientific cameras
    - Manual Stage for cameras
    - Camera lenses
    - Optical Beam splitter cube & mount

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