

Increasing the Frequency of Laser Impulses with Optical Choppers with Rotational Shafts

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Abstract : Optical choppers are among the most common optomechatronic devices, utilized in numerous applications, from radiometry to telescopes and biomedical imaging. The classical configuration has a rotational disk with windows with linear margins. This research points out the laser signals that can be obtained with these classical choppers, as well as with another, novel, patented configuration, of eclipse choppers (i.e., with rotational disks with windows with non-linear margins, oriented outwards or inwards). Approximately triangular laser signals can be obtained with eclipse choppers, in contrast to the approximately sinusoidal - with classical devices. The main topic of this work refers to another, novel device, of choppers with shafts of different shapes and with slits of various profiles (patent pending). A significant improvement which can be obtained (with regard to disk choppers) refers to the chop frequencies of the laser signals. Thus, while 1 kHz is their typical limit for disk choppers, with choppers with shafts, a more than 20 times increase in the chop frequency can be obtained with choppers with shafts. Their transmission functions are also discussed, for different types of laser beams. Acknowledgments: This research is supported by the Romanian National Authority for Scientific Research, through the project PN-III-P2-2.1-BG-2016-0297.

Keywords : laser signals, laser systems, optical choppers, optomechatronics, transfer functions, eclipse choppers, choppers with shafts

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