

# Memory Effect Phenomena in Doped Liquid Crystals

Marek Veveričík <sup>a)</sup>, Peter Bury, and František Černobila

*Department of Physics, Žilina University, 010 28 Žilina, Slovak Republic*

<sup>a)</sup> Corresponding author: [vevericik@fyzika.uniza.sk](mailto:vevericik@fyzika.uniza.sk)

**Abstract.** This study explores the memory effect in nematic liquid crystals (NLCs) when doped with various nanoparticles. The experimental approach focused on observing how changes in the dopand and concentration of nanoparticles affect the light transmission through NLCs under applied external field. Such insights are invaluable for designing next-generation liquid crystal devices with tailored properties for specific applications, ensuring optimal performance and durability with introduction of role of nanoparticles in LC systems. It is evident that while some nanoparticles like SiO<sub>2</sub> enhance the memory effect, others like Fe<sub>3</sub>O<sub>4</sub> might introduce undesirable complexities. The enhanced memory effects facilitated by nanoparticles open numerous applications in advanced display technologies, including flexible displays and high-resolution screens. Additionally, the findings have significant implications for the design of optical switches and sensors that operate under low-power conditions, enhancing the energy efficiency of these devices.

## ACKNOWLEDGMENTS

This work was supported by VEGA project 2/0043/21. Authors sincerely want to thank Prof. Peter Kopčanský and Milan Timko for their support in this research.