Scientists develop new technique that reduces halo effect caused by lenses

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In a recent study published in *Optics Communications*, scientists from Bar-Ilan University in Israel have presented a new technique that significantly reduces the halo effect that is generated when using multifocal (contact and intra-ocular) lenses and looking at bright point sources in dark conditions.

Presbyopia is a result of natural aging and stems from a gradual thickening and decrease in elasticity of the lens inside the eye. Corrective lenses used to address presbyopia often lead to a halo effect. This is basically a glow or color light pattern observed when looking at a bright source of light in front of a dark background. It is mostly experienced at night when people see halos around street lamps and car headlights, and it can make driving at night unsafe or even impossible in extreme cases.

Co-author of the paper, Prof. Zeev Zalevsky, head of the Electro-Optics study program of the Faculty of Engineering at Bar-Ilan, explains, "Our solution involves smoothening the surface structure of a contact lens or an intra-ocular lens that has extended depth of focus or multifocal capabilities. The smoothening does not complicate the fabrication complexity of the lens and yet yields the same optical performance in treating presbyopia and assisting people after cataract surgery, but with about one order of magnitude smaller. This allows people that use such lenses to be able to use them also at night."

More and more commercial ophthalmic products incorporate EDOF

(extended depth of focus) and multifocal technologies in contact and intra-ocular lenses to solve presbyopia. Until now, such lenses were very problematic when used in dark illumination conditions. The researchers say their proposed concept can resolve the above difficulties and make the existing products even more applicable and useful.

More information: "Ophthalmic halo reduced lenses design" by Ofer Limon and Zeev Zalevsky. DOI: 10.1016/j.optcom.2014.12.049

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