VIDEO ARTICLE

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Drive Type Virtual Reality Image on a Head Mounted Display

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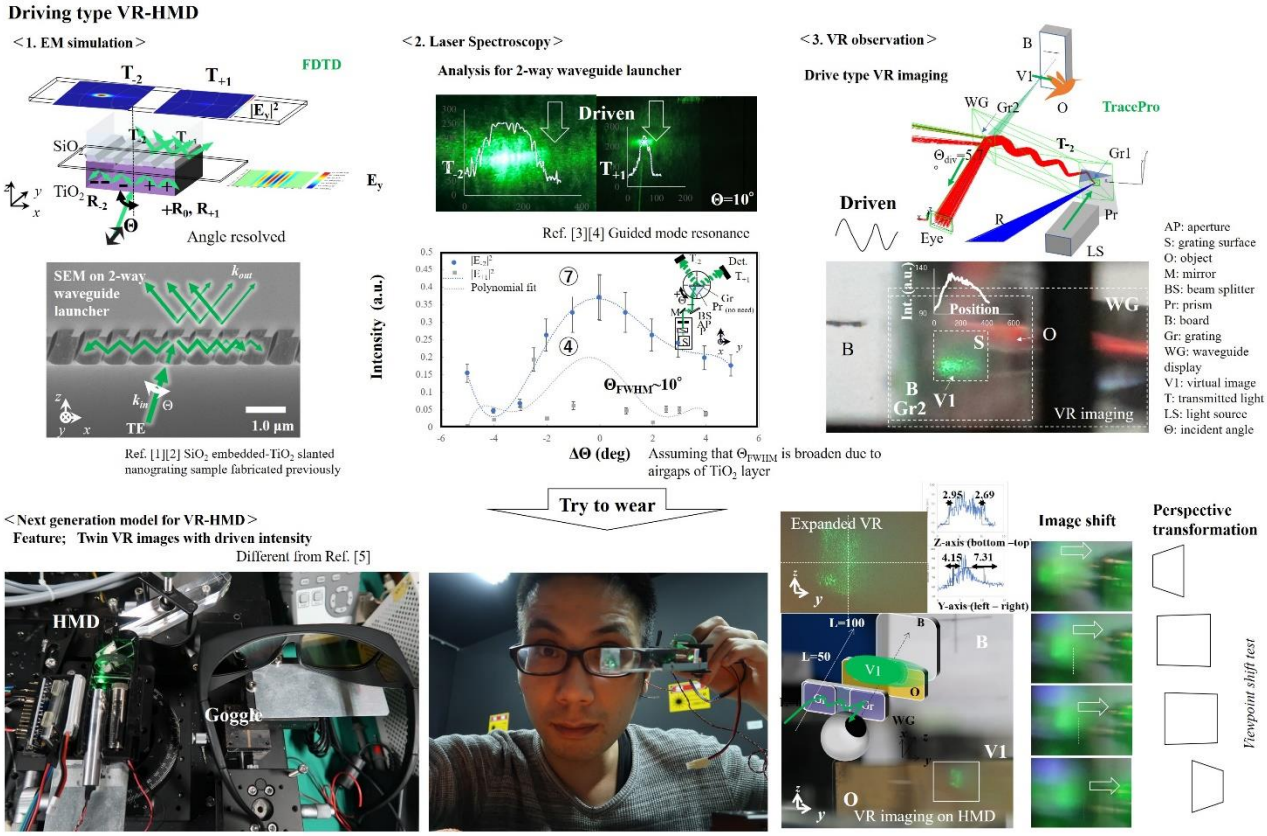
Graphical Abstract



Abstract

I realized the high-power drive type of emission beam generated at the surface by using the excitation of the guided mode in a TiO_2 slanted nanograting layer. In the TiO_2 layer, the beam is waveguided along the short-axis direction of the grating at a specific injection angle Θ. On the surface of the layer, a beam consisting of leakage generated during the waveguide is emitted. The emitted beam would have a high optical intensity compared with the general emission. Furthermore, it would generate an afterimage for the waveguide direction. In this work, I performed angle-resolved measurements to obtain two effects, namely intensity improvement and after(-driving)imaging. Subsequently, I identified an appropriate resonance condition for the above radiation on the 1D waveguide on the

surface. Thereby, the resonance peak for the waveguide with Θ_{FWHM} = 8.0–10.0° at Θ = 10° was verified in the measurement. At resonance, high order diffraction beams for -2nd and +1st are seen. The field ratio for the diffraction beams had the following relationship: $|E_{-2nd}|:|E_{+1st}|$ = 7:4, and diffraction efficiency (D.E.) for -2nd was ~30% at maxima. Furthermore, their beams created short afterimages in one direction. These images could also reproduce on Virtual Reality (VR) images. This grating sample is likely to be effective as a novel coupler on a binocular Virtual Reality – Head Mounted Display (VR-HMD).

Keywords: VR-HMD, TiO_2 slanted nanograting, guided mode resonance, drive, waveguide launcher.

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Biography

Yoichi Ogata is a Researcher/Staff in the Department of Research and Development in Koito Manufacturing Co., Ltd. His research is in the area of "Nanotechnology" and "Optics". He received the Ph.D. in Materials Science from JAIST. He worked for several years as a Project Assistant Professor at TUAT, Visiting Research Associate and then later on as Research Associate in University of Rochester. After this, he started working in RIKEN as a researcher, and then moved to University of Tokyo as a collaborative researcher and Yokohama National University as a project researcher. He brought to the table my passion for studying and teaching at a university level "Nonlinear Optics of Nano and Micro structures" as it primary focused on my career.

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