

VirtualLab Fusion Applications, Technology & Workflows

AR & MR Devices – How to Model Light Guides in VirtualLab Fusion

Presenter: Olga Baladron-Zorita & Dr Stefan Steiner
LightTrans International

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Webinar in Cooperation With Photonics Media

Lightguides for Mixed Reality Glasses: Design Techniques and Challenges

The use of lightguides with diffraction gratings has become of great interest in the development of augmented reality and mixed reality glasses. The propagation of light through such lightguides requires simulation techniques beyond ray tracing. It must be possible to include physical-optics effects in a controllable manner to meet the needs in modeling and design. This webinar will introduce you to a suitable physical-optics modeling technology and demonstrate it in the software VirtualLab Fusion.

To the
webinar



For a more in-depth discussion of the technological background and more cool results, check out our previous webinar on the topic of light guide devices for AR & MR applications!

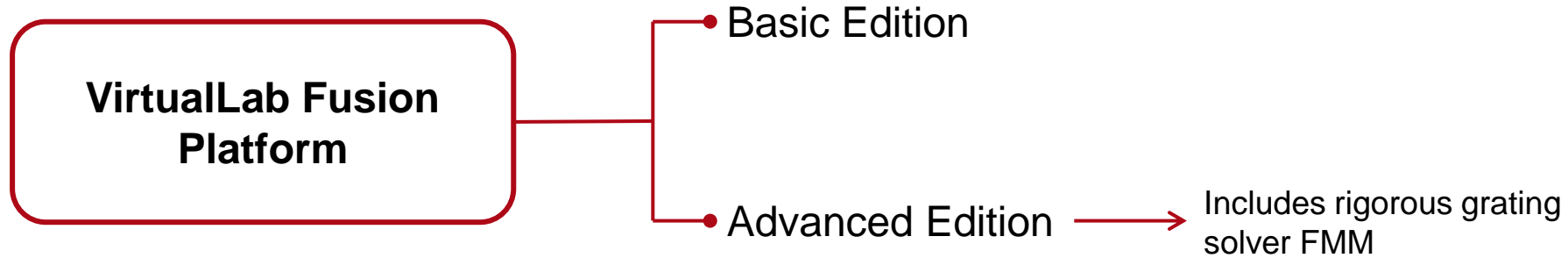
Scientists, engineers, and others whose work involves AR/MR technologies who are looking to improve their knowledge of lightguide design. Whether you are designing or developing AR/MR glasses, this webinar will provide insight into gaps in current design trends and how to

Editions & Toolboxes

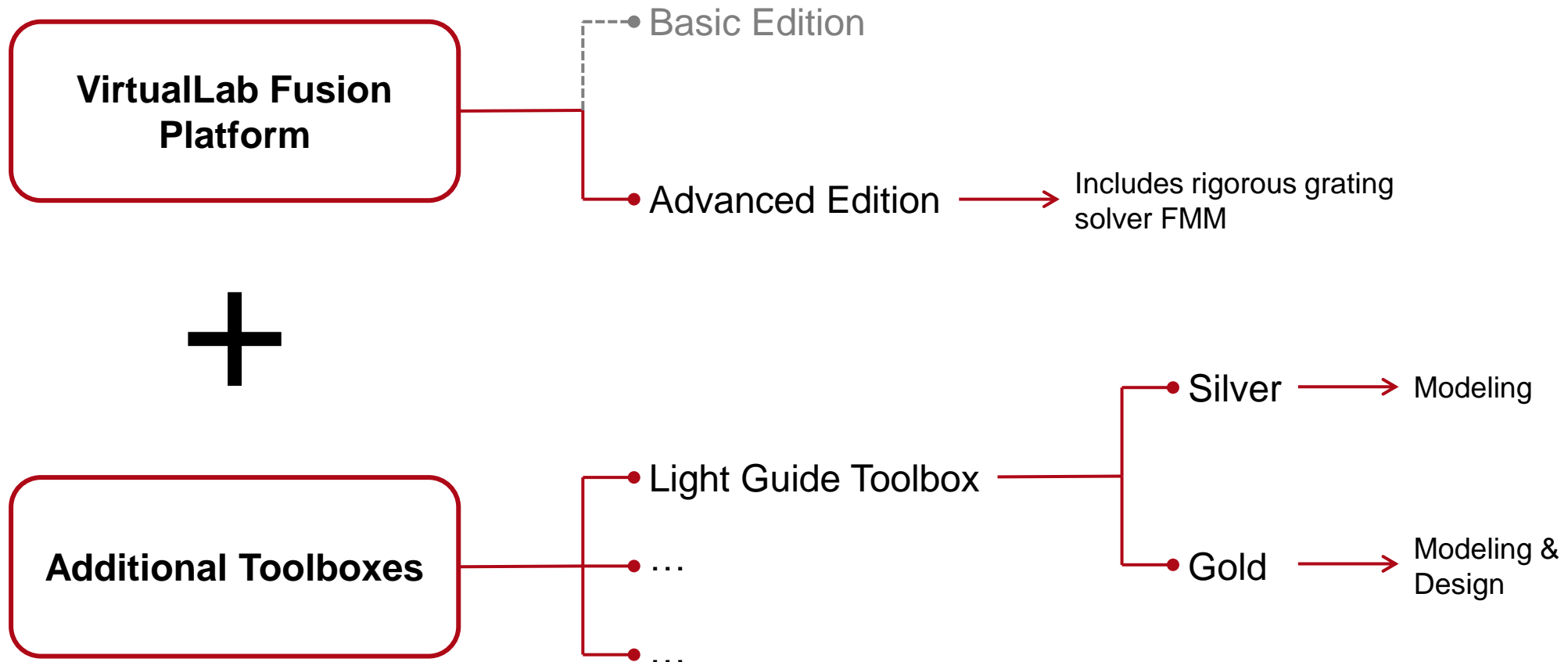
Our License Model

**VirtualLab Fusion
Platform**

Our License Model

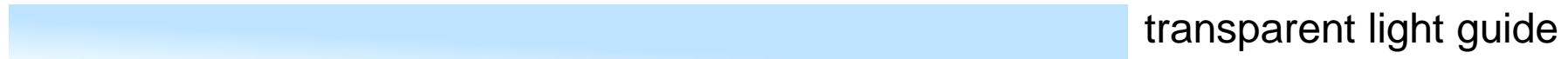
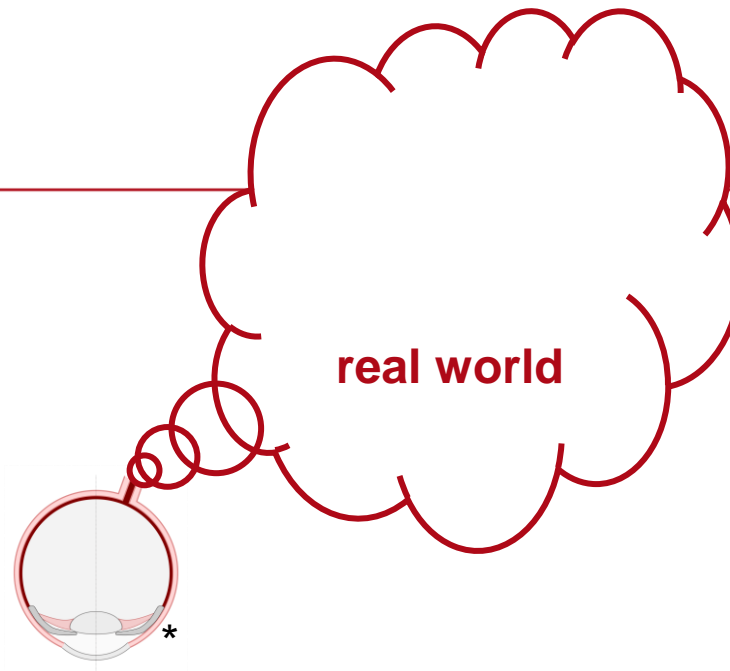


Our License Model



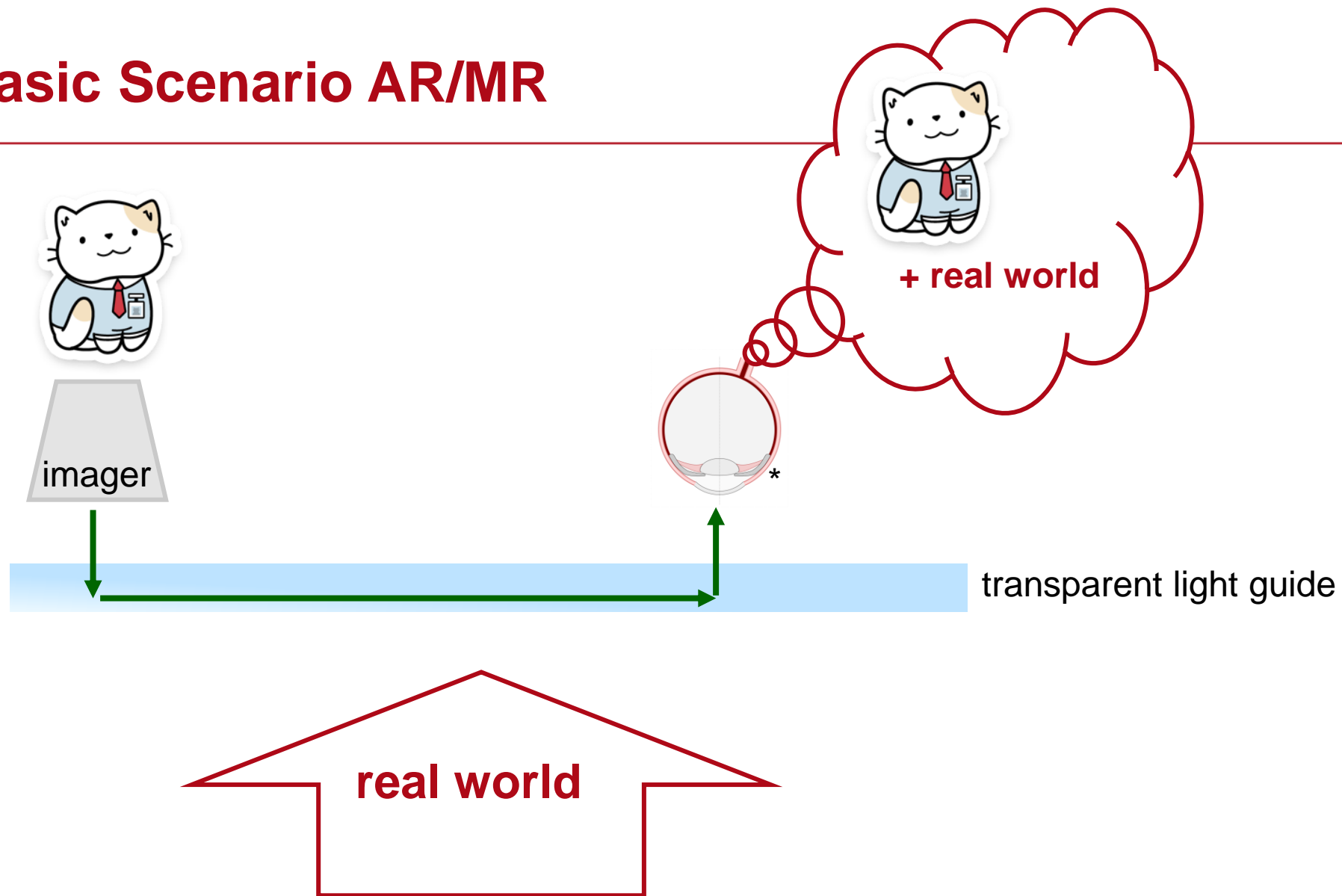
Basic Functionality

Basic Scenario AR/MR



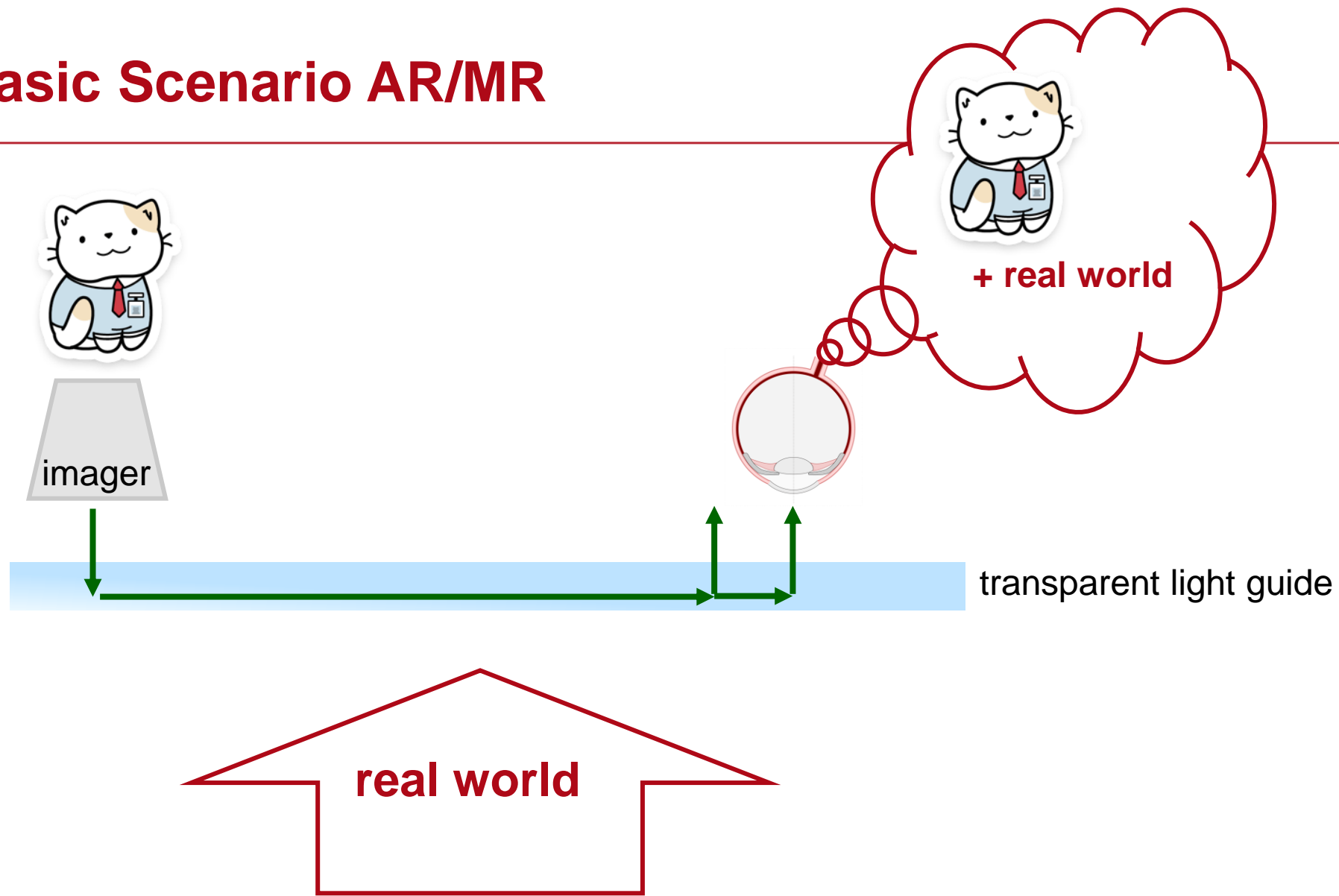
* https://www.grund-wissen.de/physik/_images/auge.png

Basic Scenario AR/MR

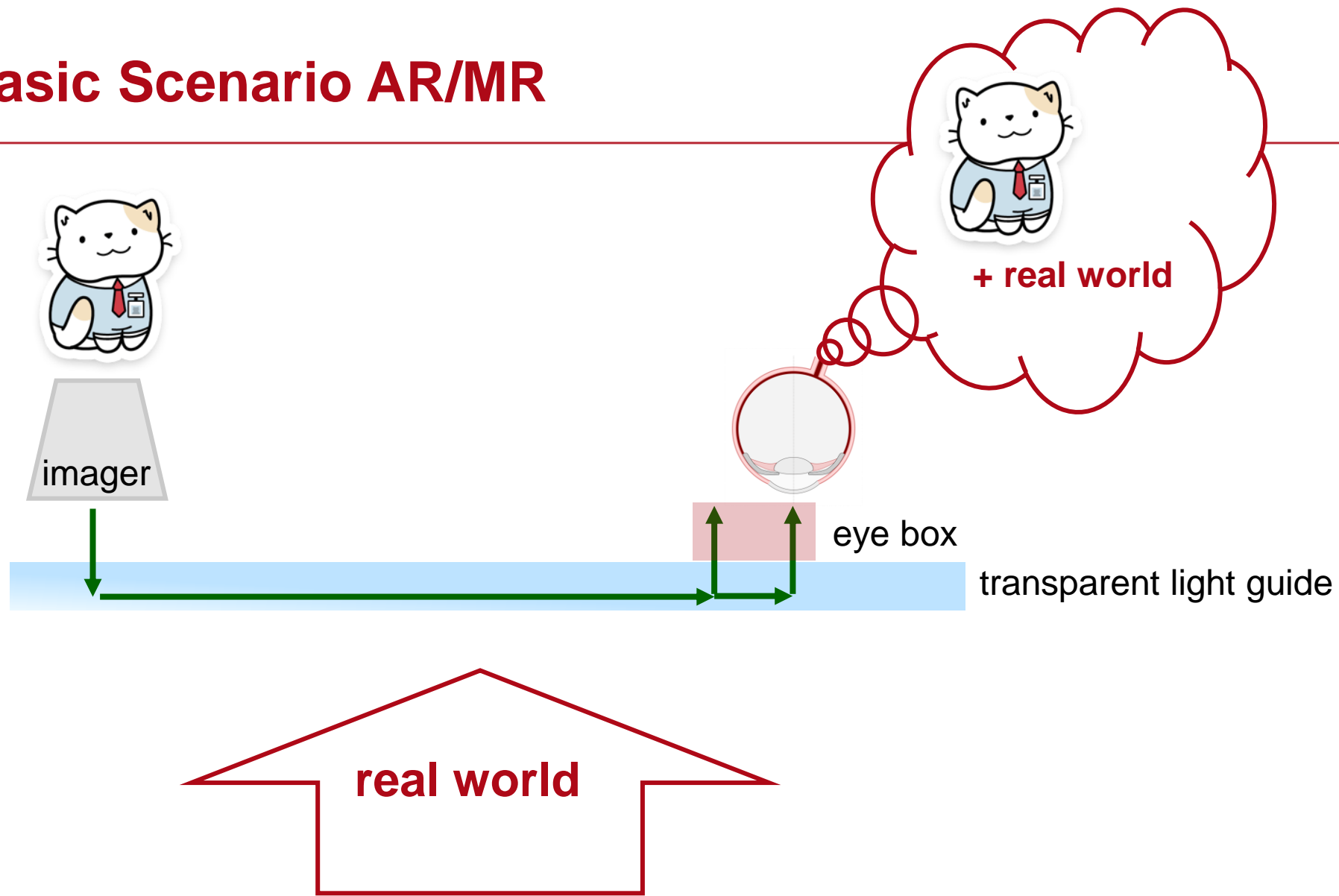


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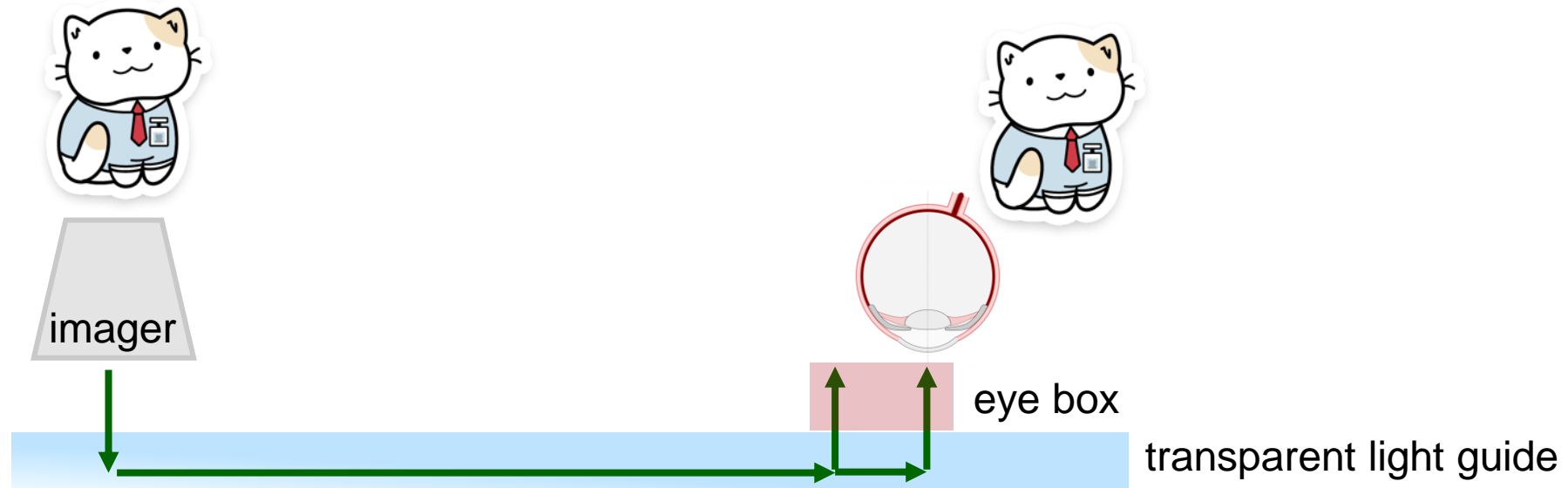
Basic Scenario AR/MR



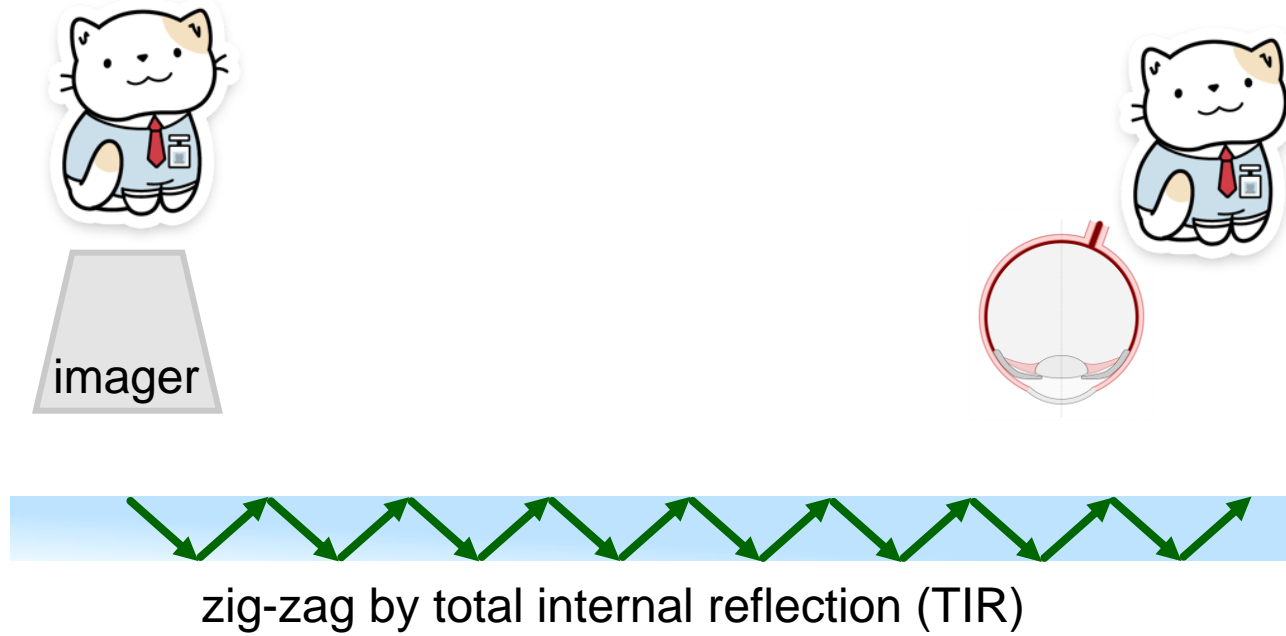
Basic Scenario AR/MR



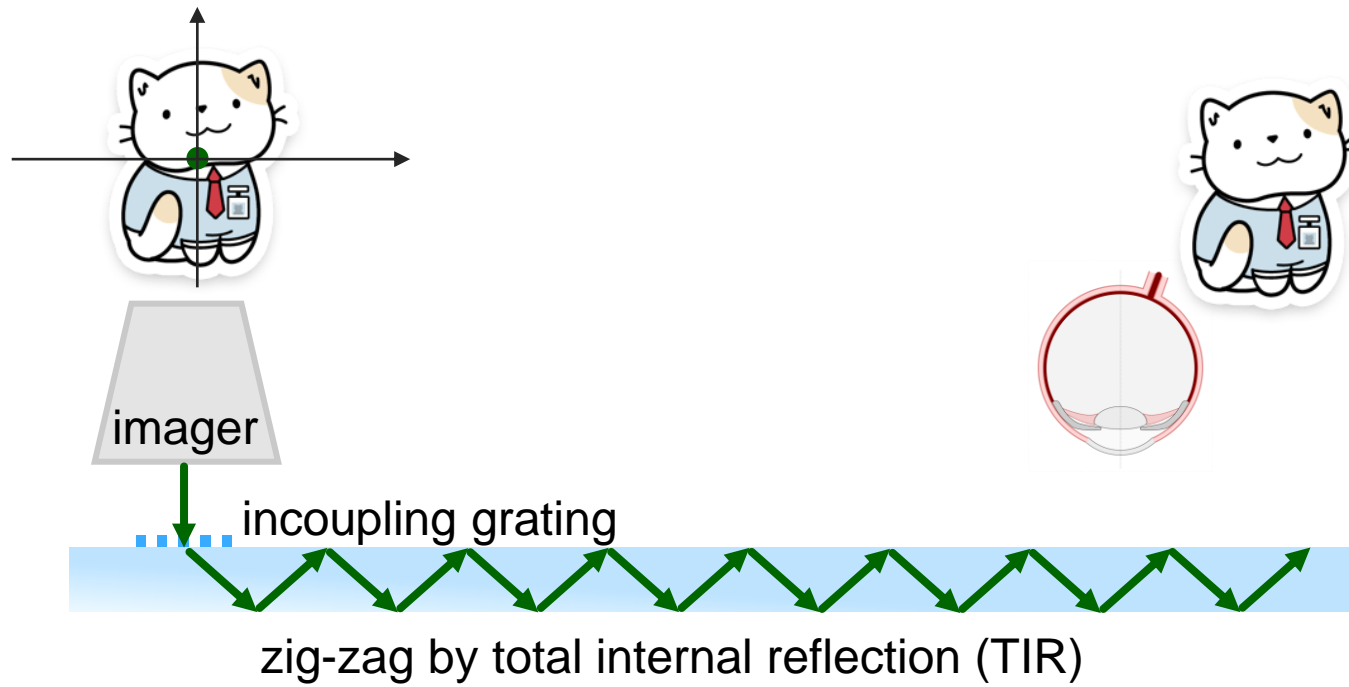
Basic Scenario AR/MR



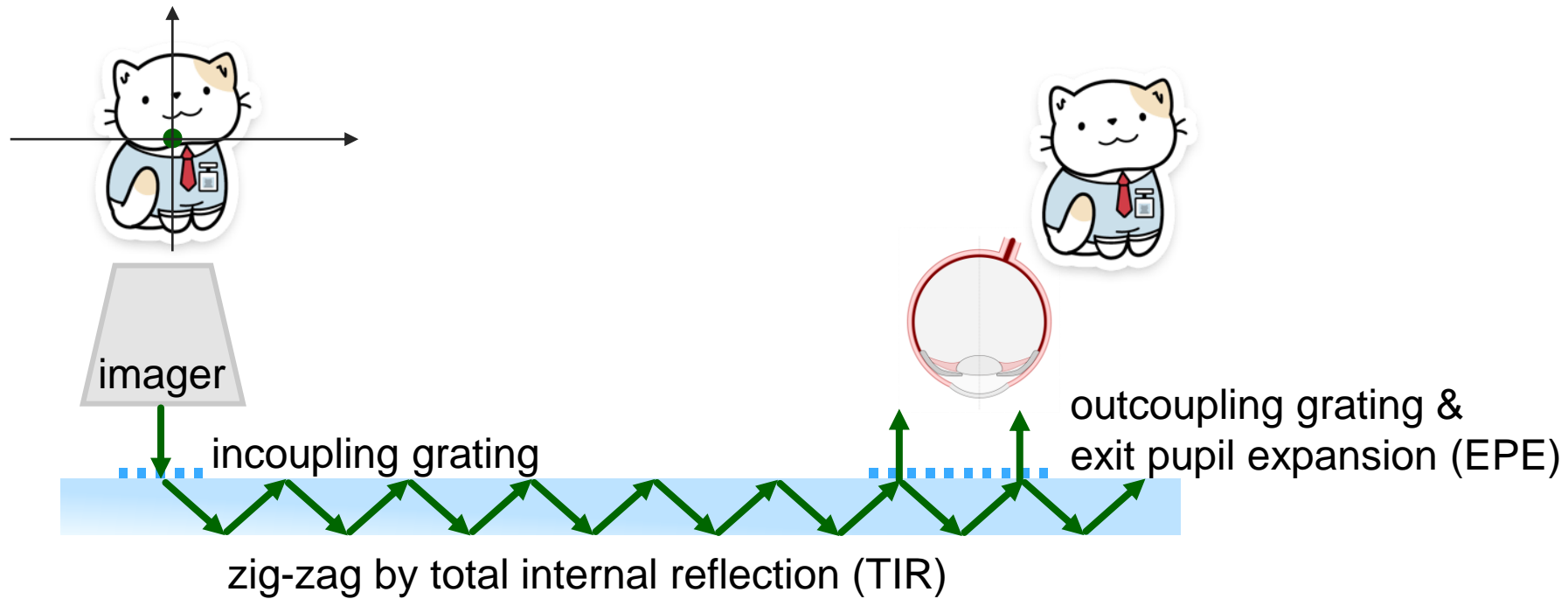
Basic Scenario AR/MR



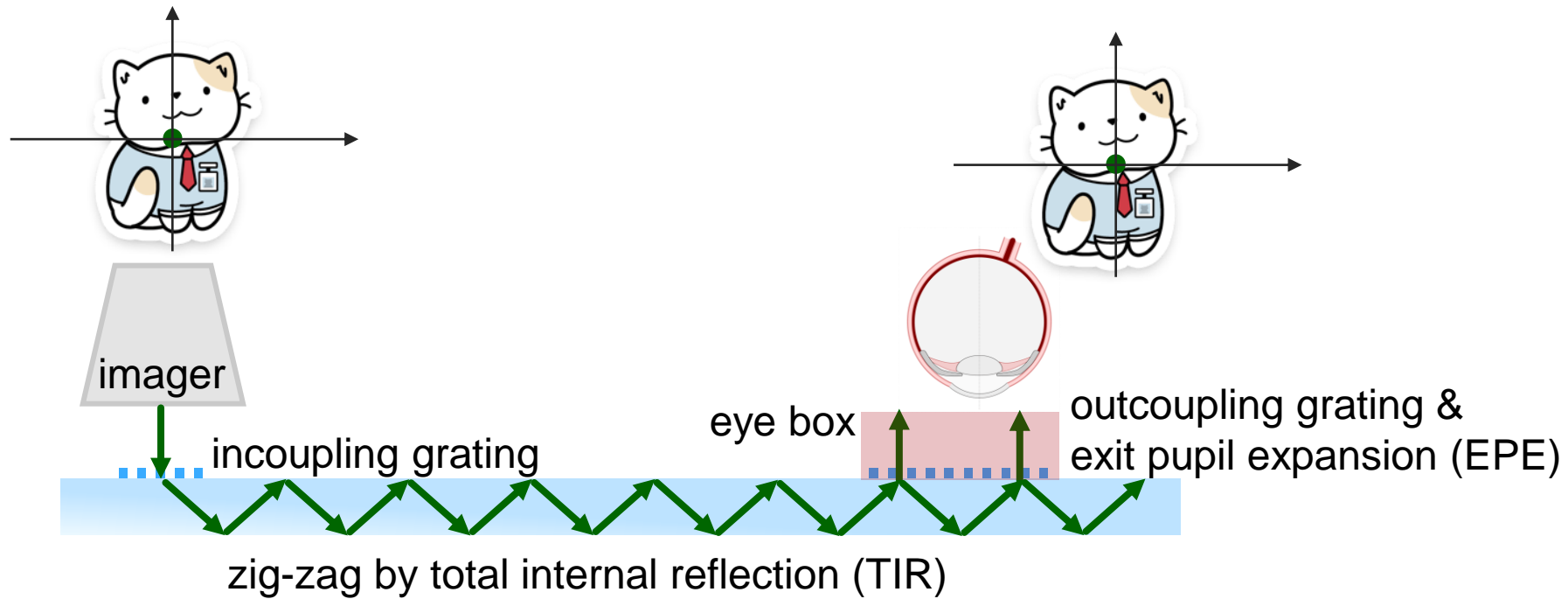
Basic Scenario AR/MR



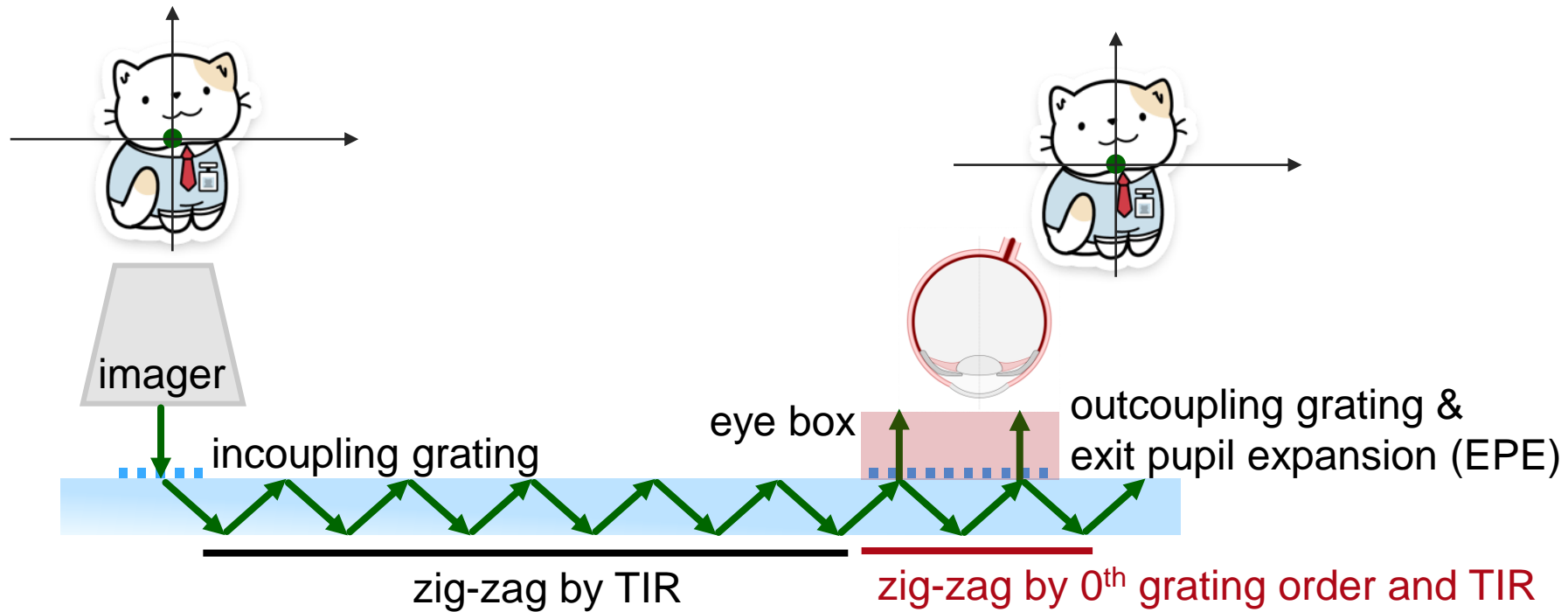
Basic Scenario AR/MR



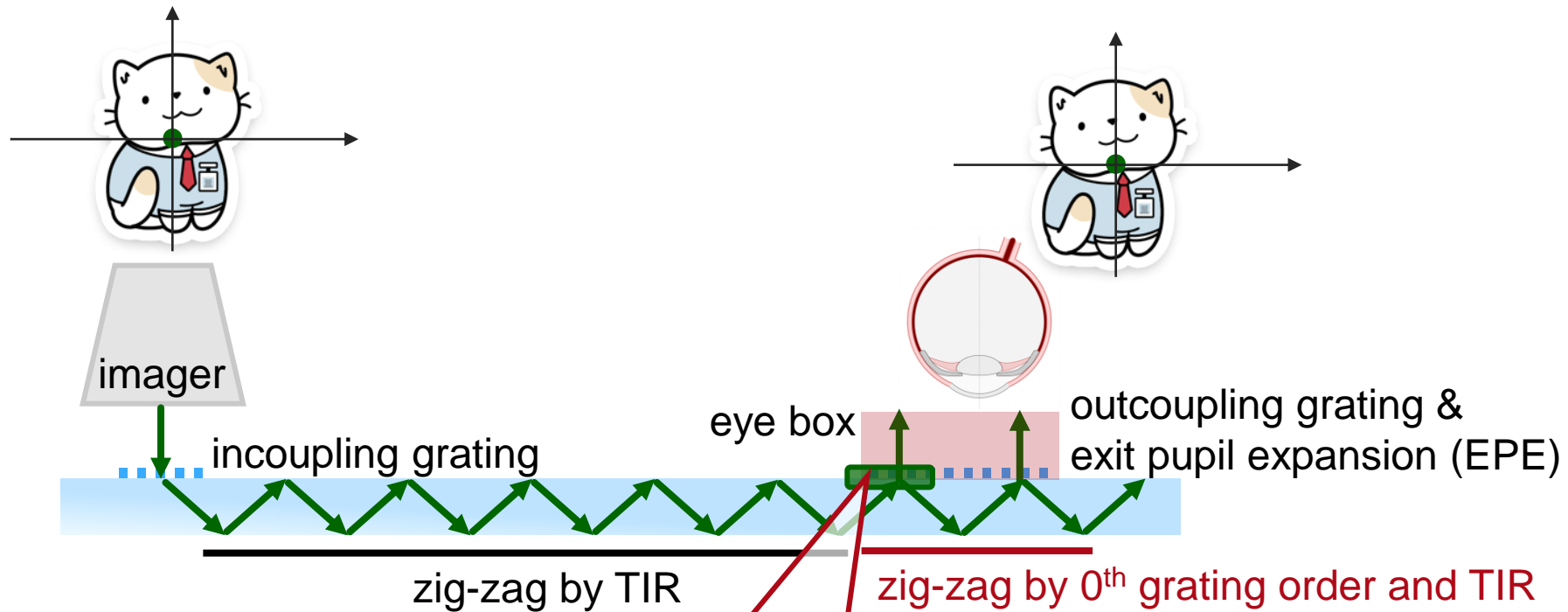
Basic Scenario AR/MR



Basic Scenario AR/MR

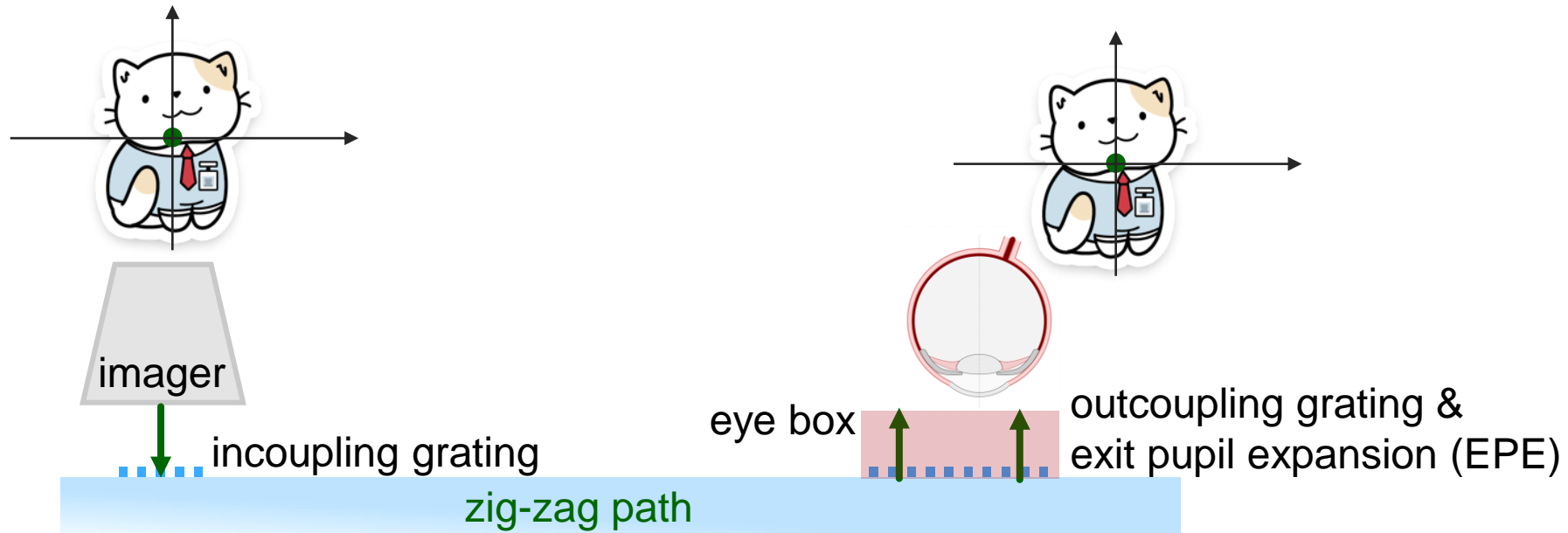


Basic Scenario AR/MR

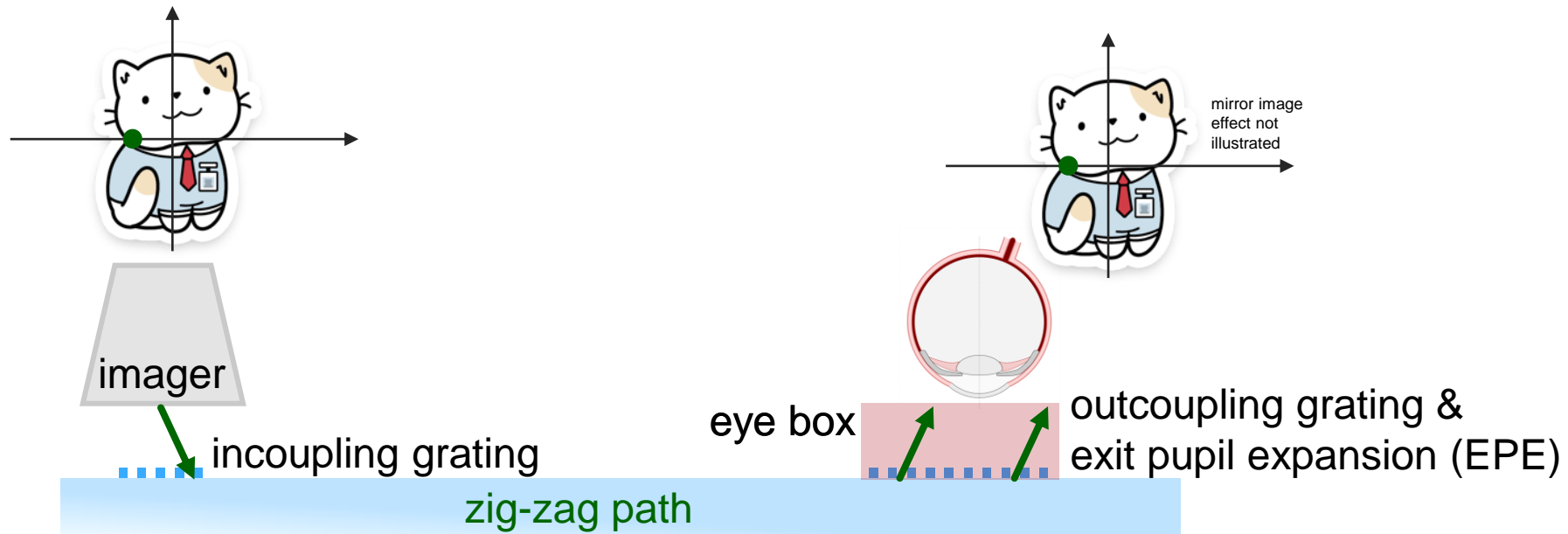


Beams have an extension;
may be reflected partly by TIR
and partly by 0th order!

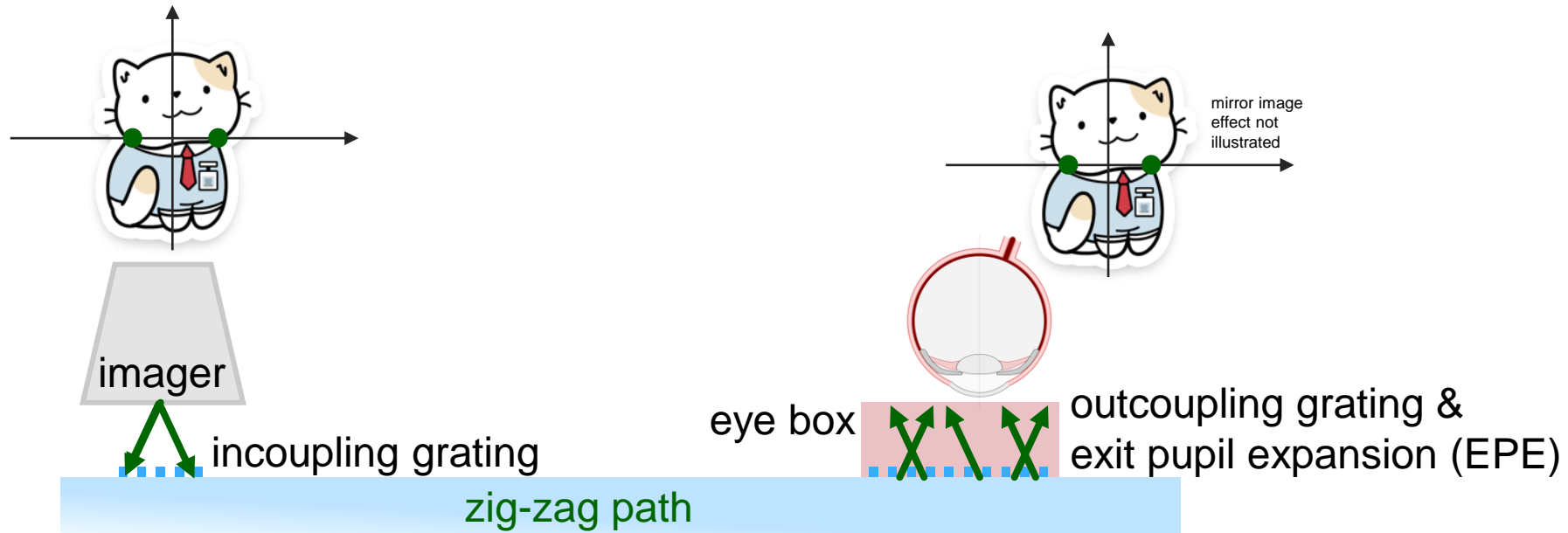
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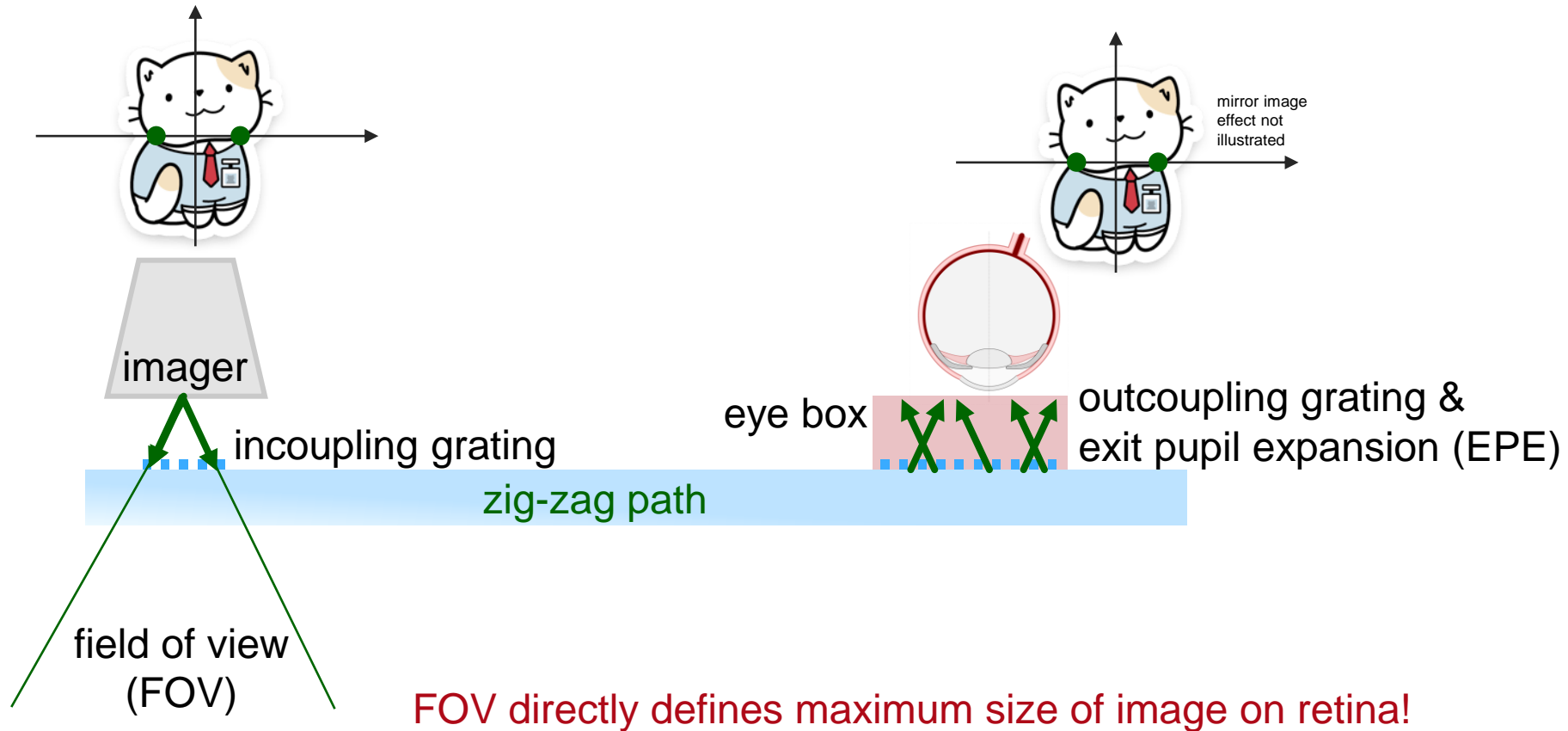
Basic Scenario AR/MR



Basic Scenario AR/MR



Basic Scenario AR/MR



K-Layout Visualization

Illustration HoloLens 1 –Type Layout

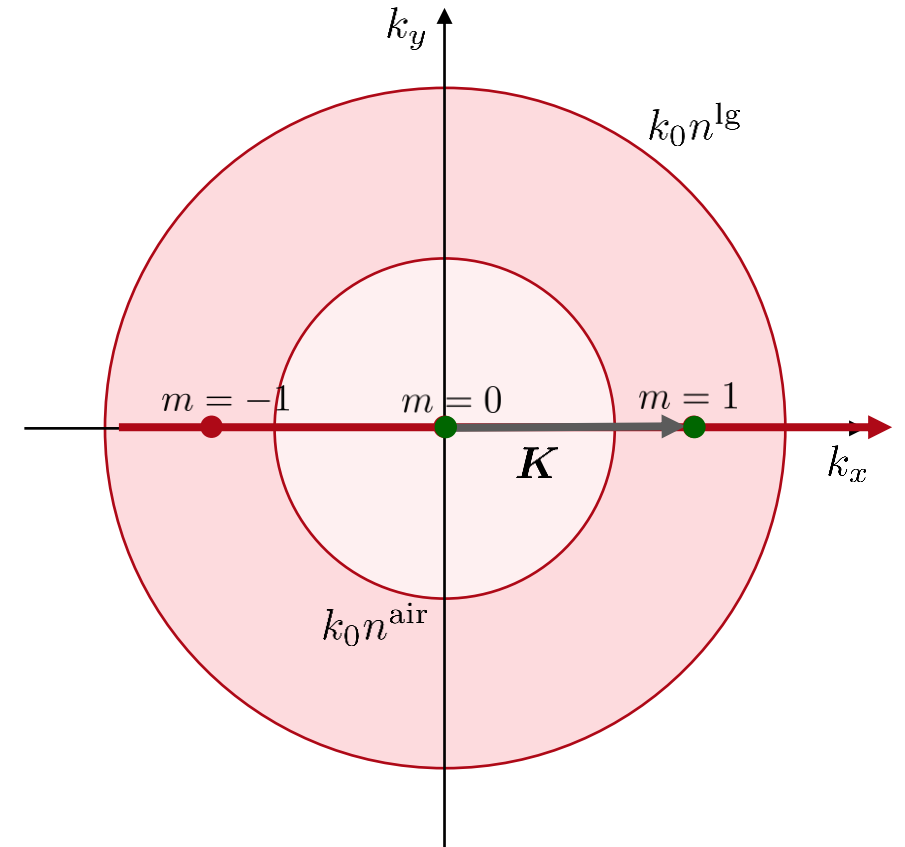
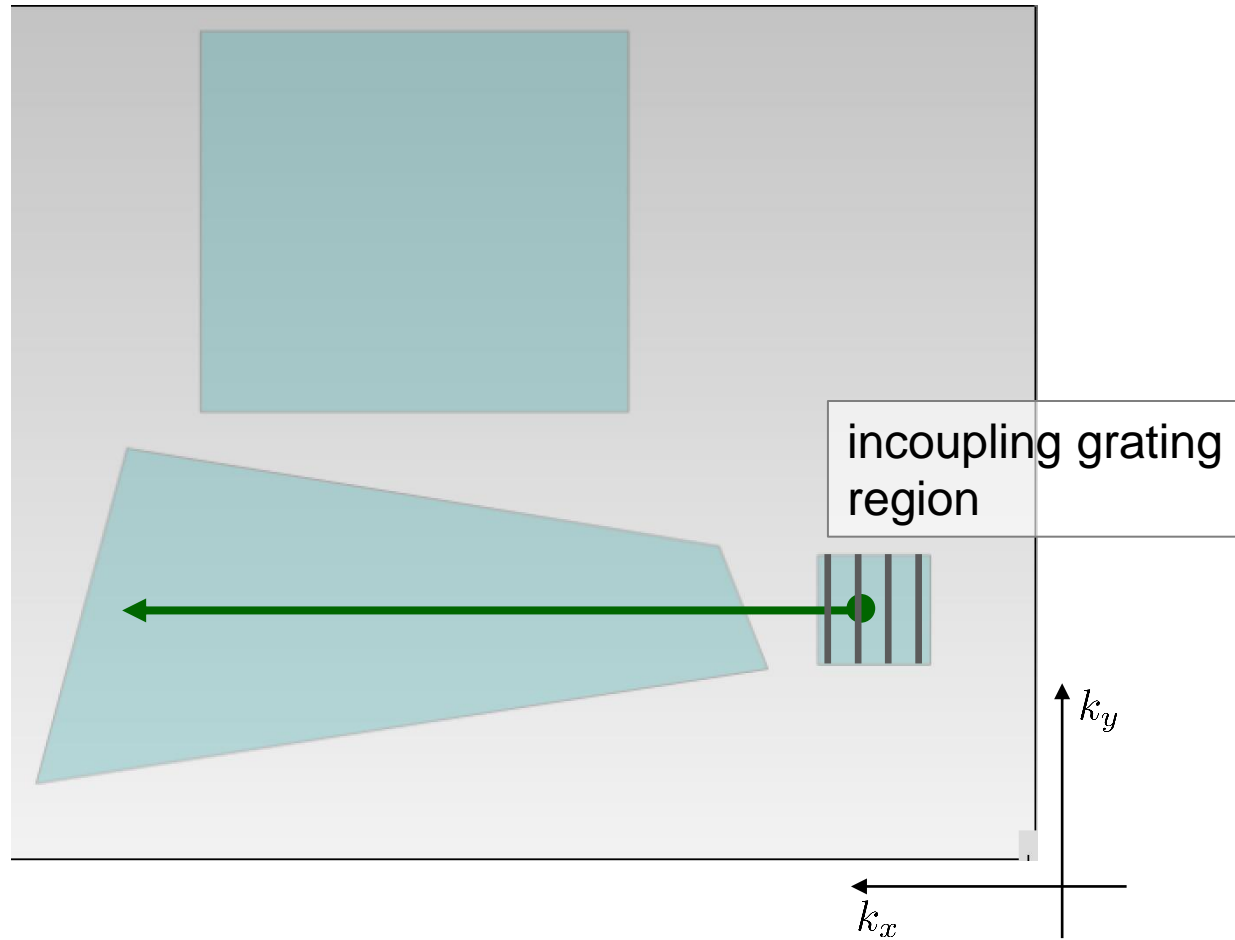


Illustration HoloLens 1 –Type Layout

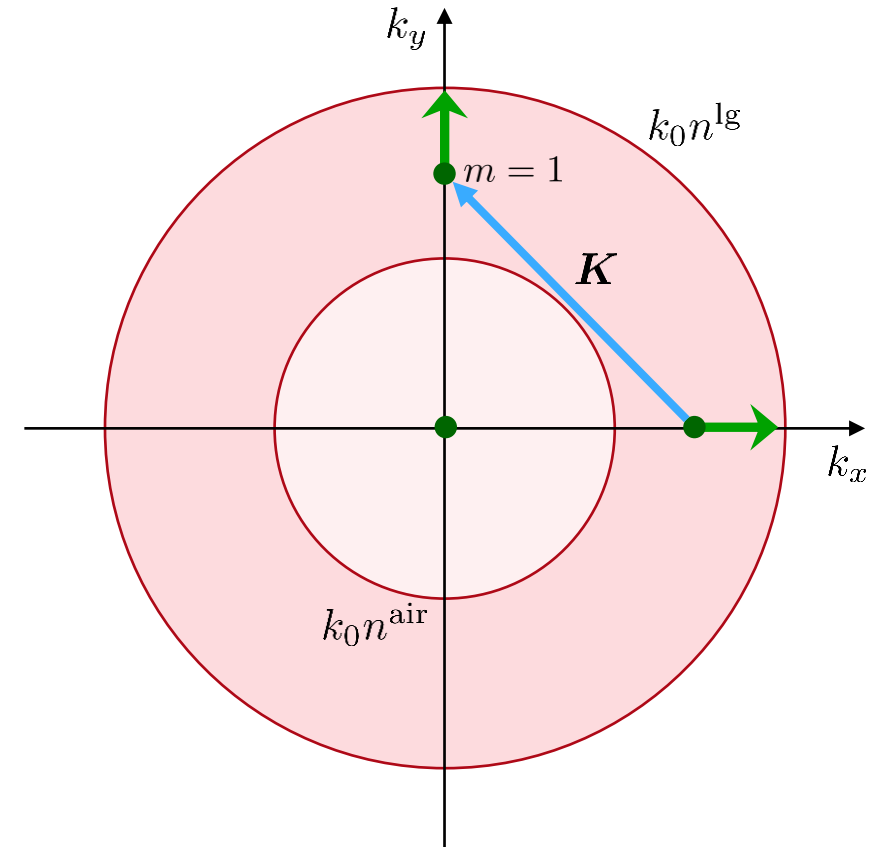
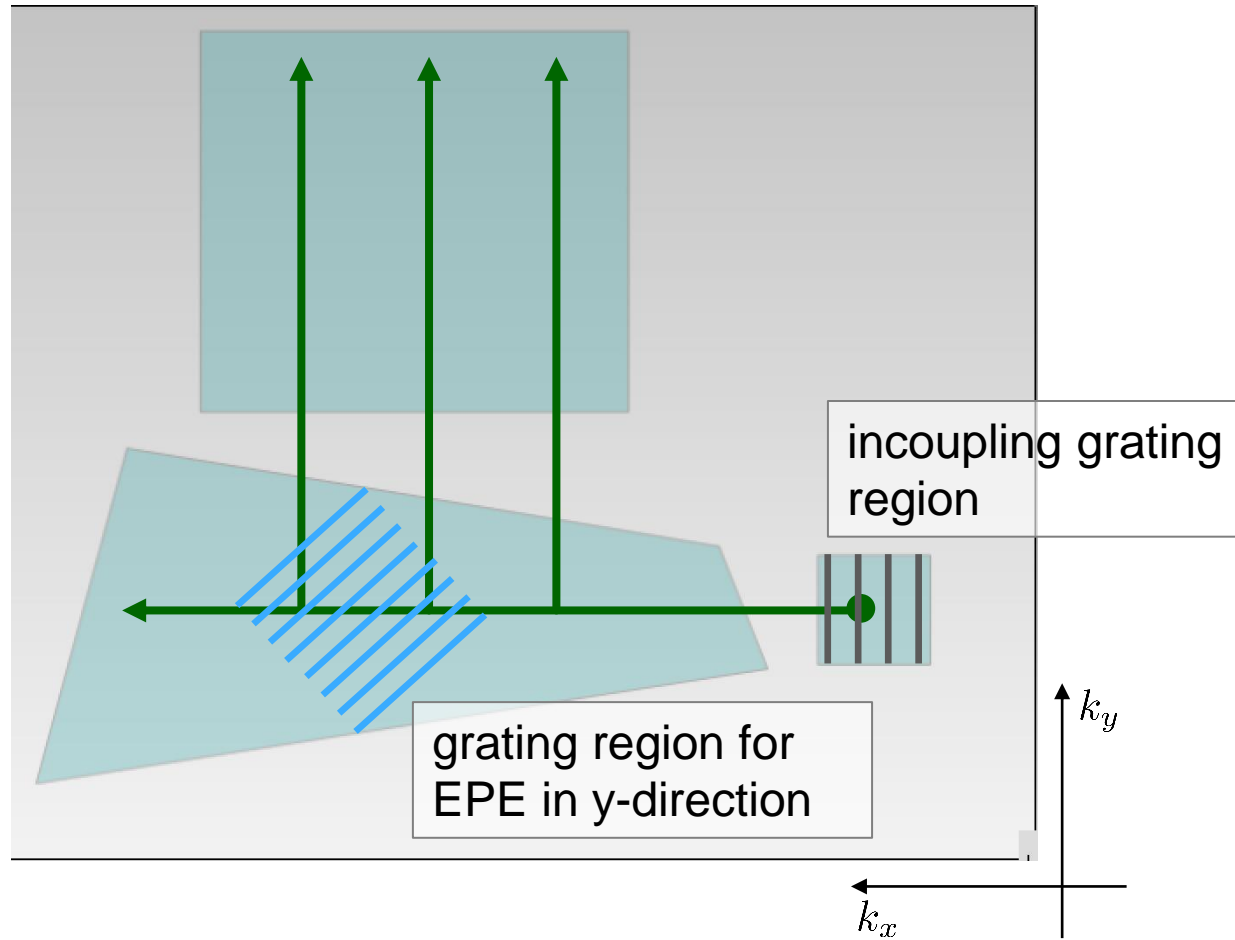
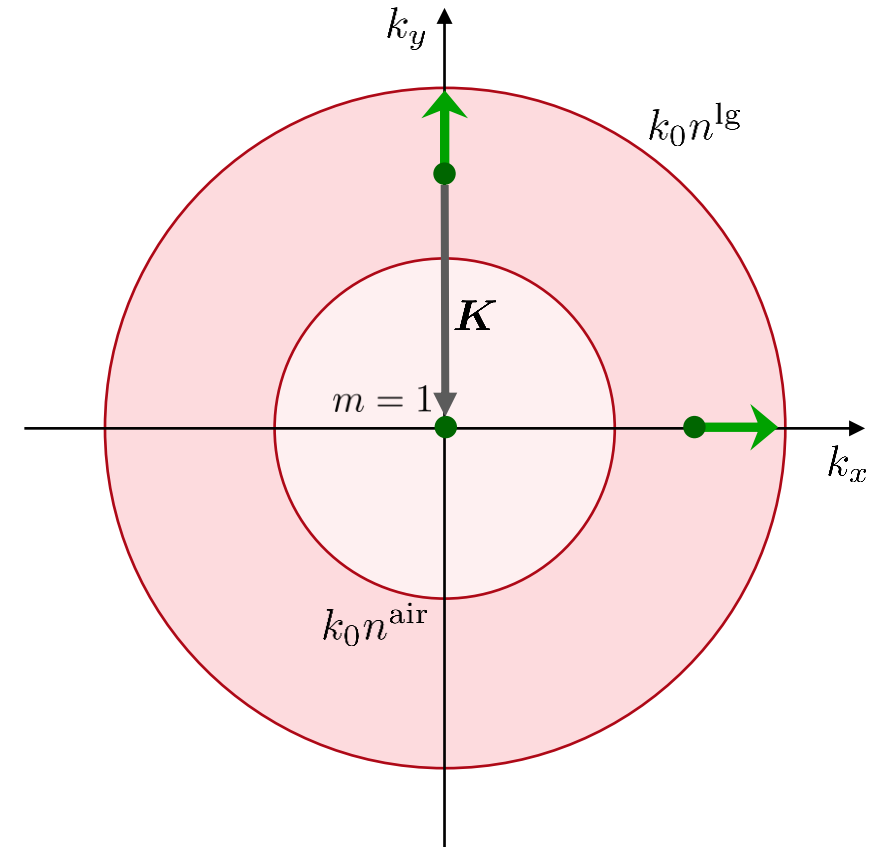
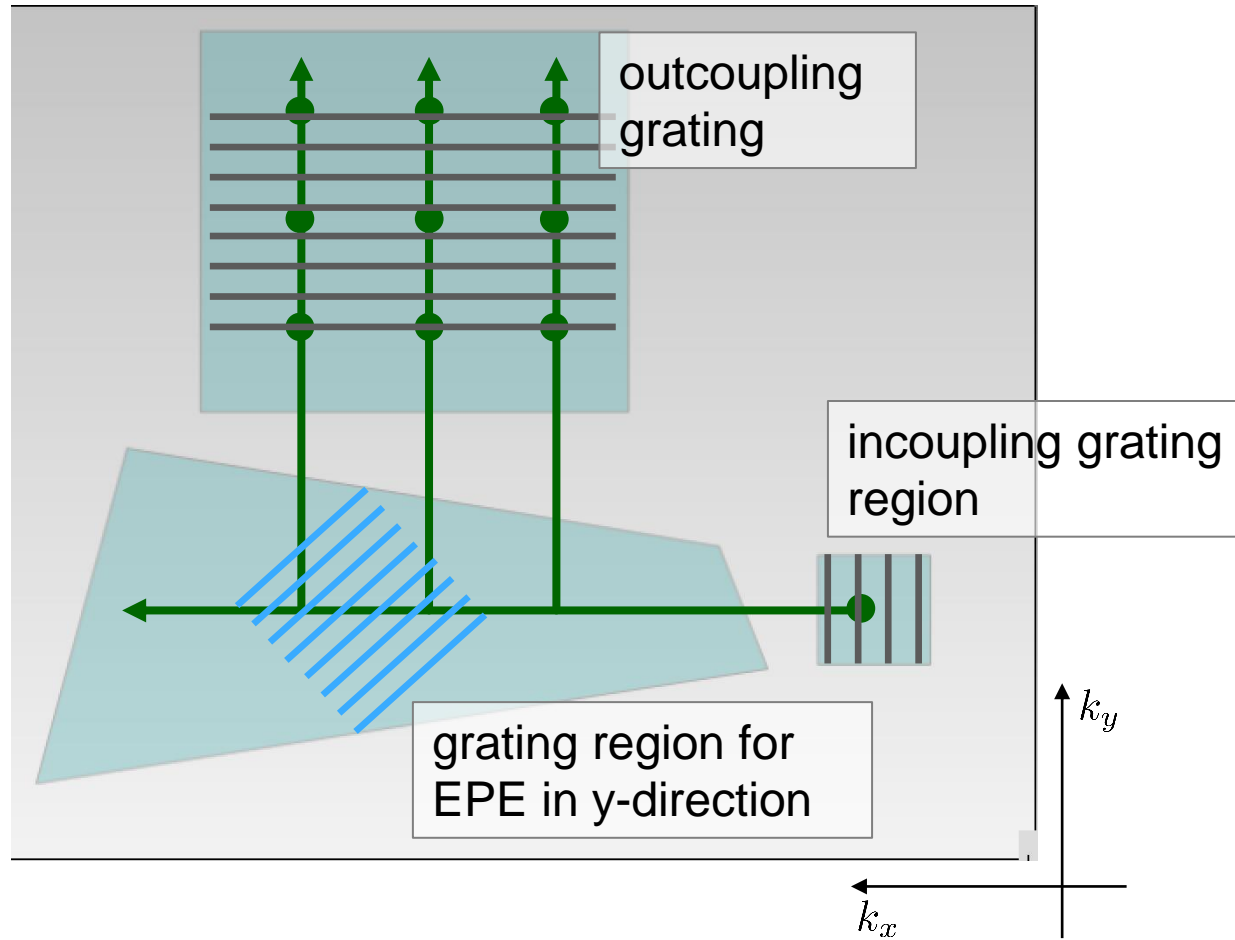
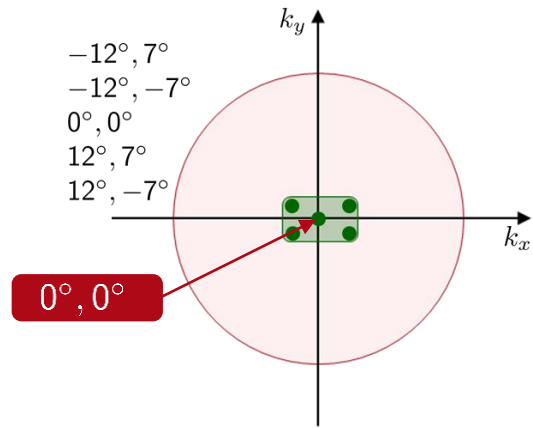


Illustration HoloLens 1 –Type Layout



Polarization

Electric Field Amplitude: Input and Inside View

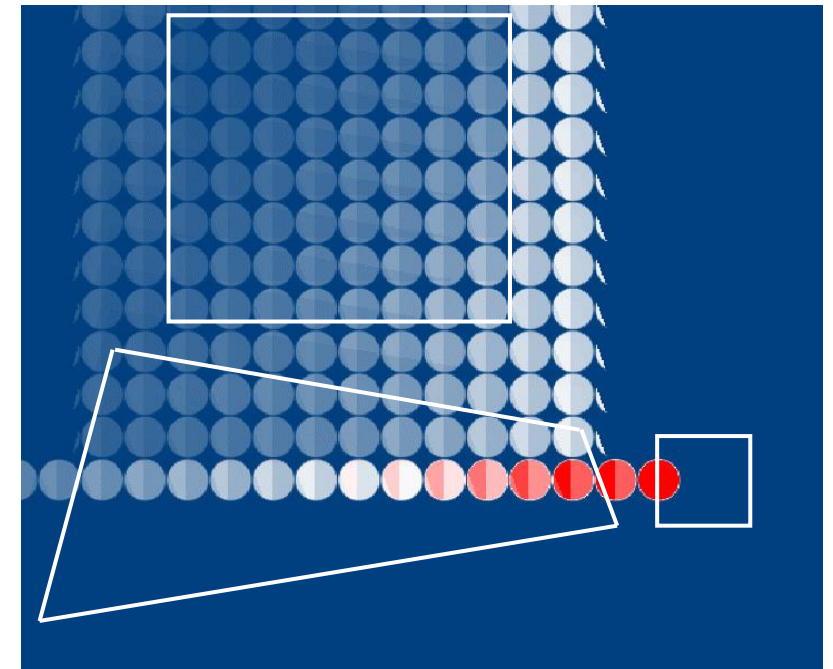
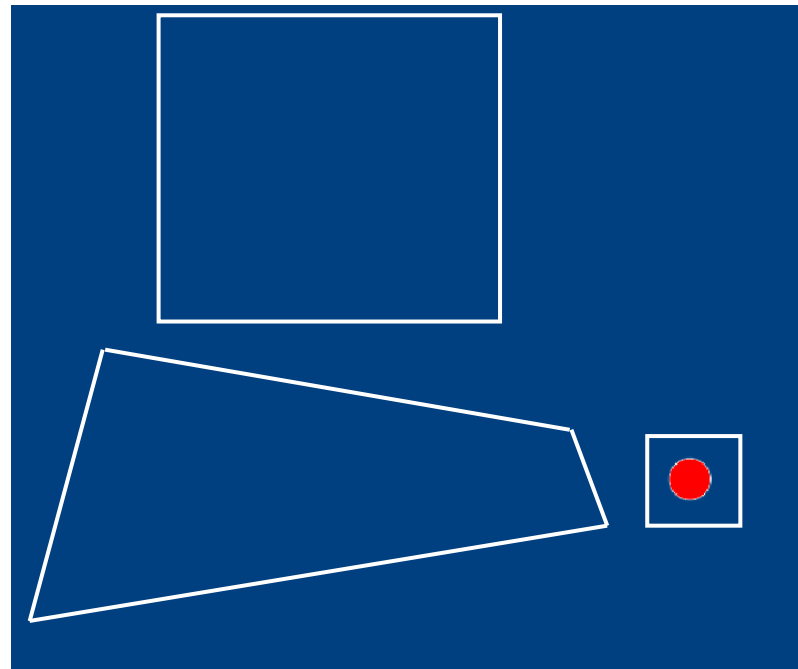
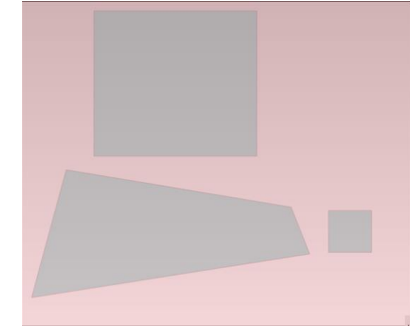
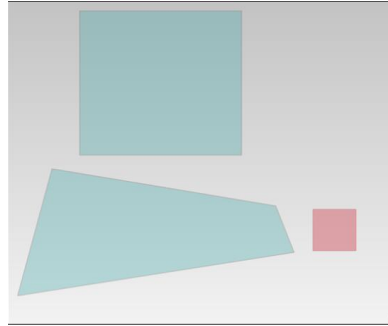


$$E_x^{\text{in}} = 1, E_y^{\text{in}} = 0$$

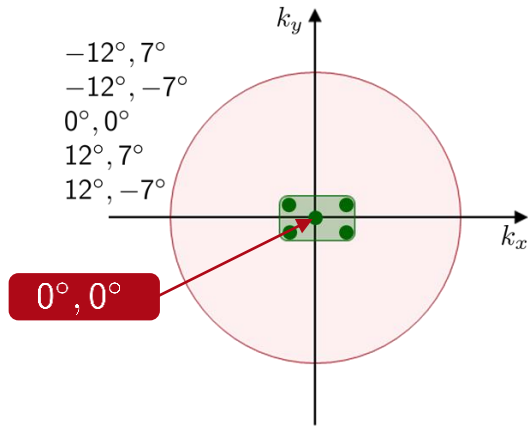
$$\lambda = 530 \text{ nm}$$

$$r = 0.8 \text{ mm}$$

Detector: $E_x(x, y)$



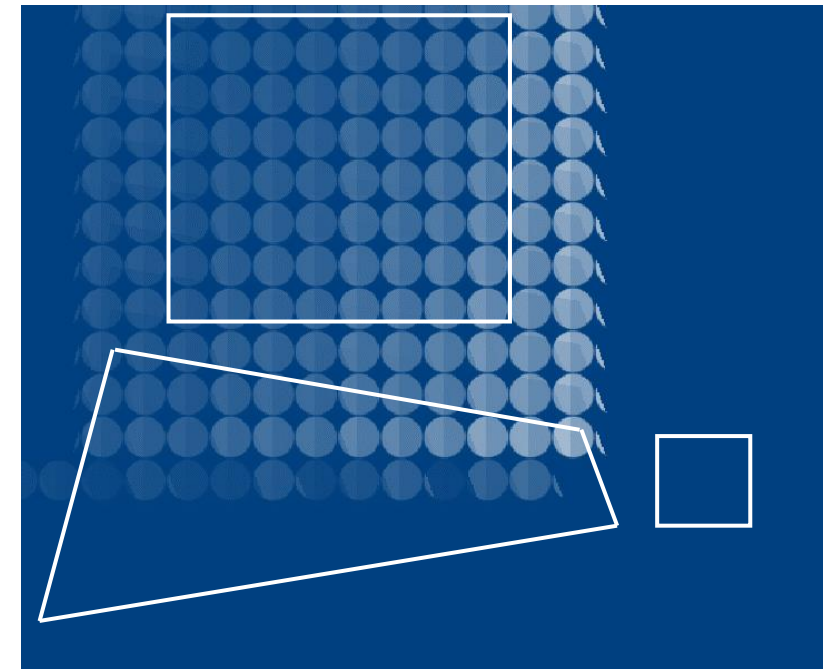
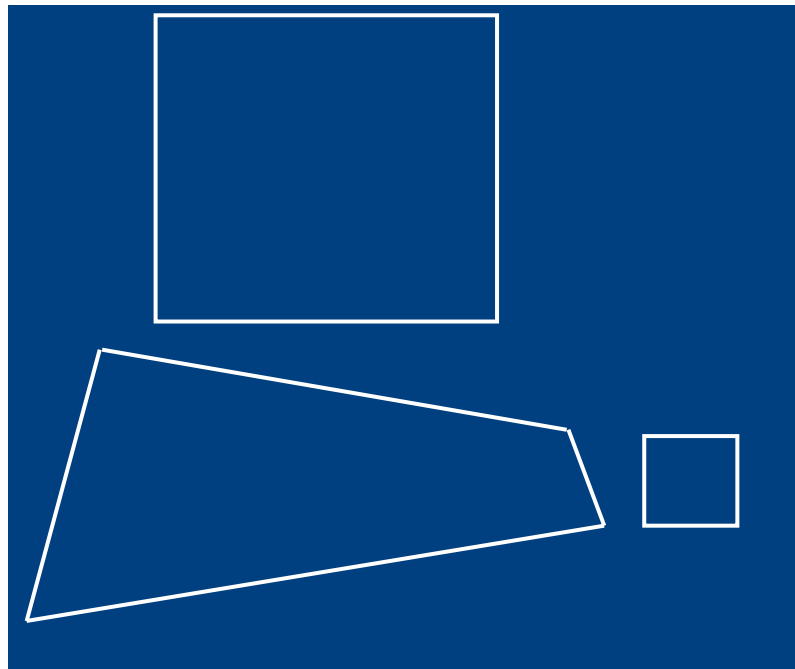
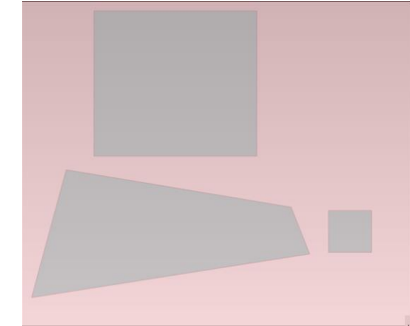
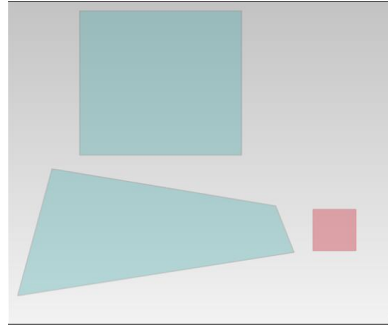
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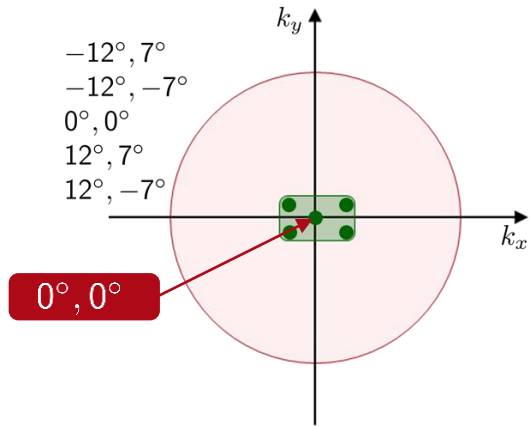
Detector: $E_y(x, y)$

We obtain crosstalk from E_x to E_y ! That significantly changes the state of polarization on the zig-zag path through the light guide.



Temporal Coherence

Intensity Detector: Output View – Frequency Model

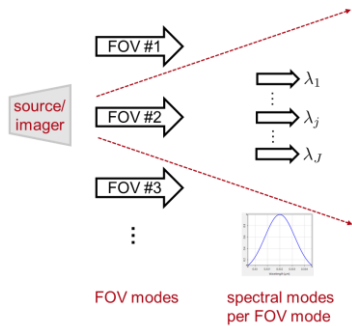
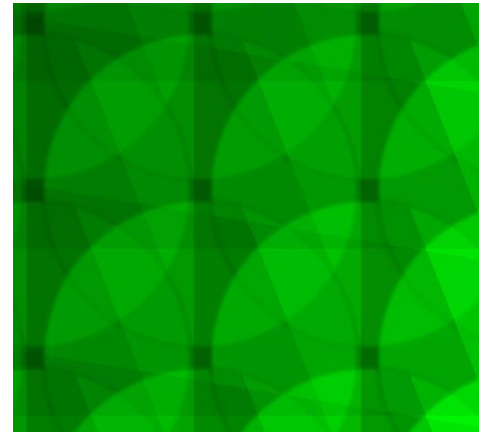
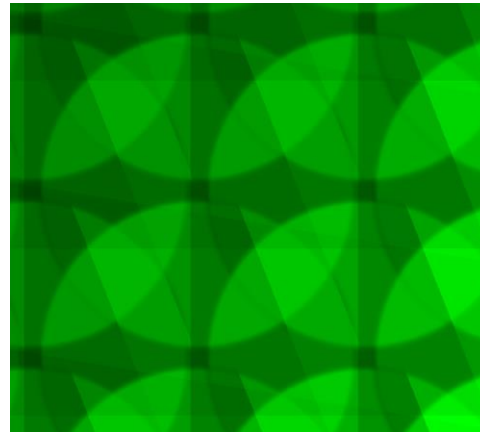
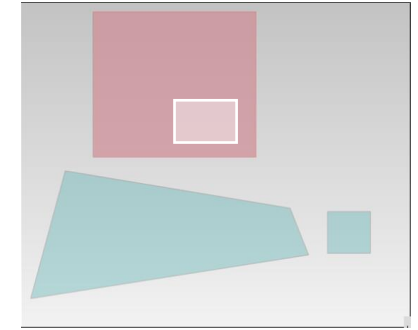
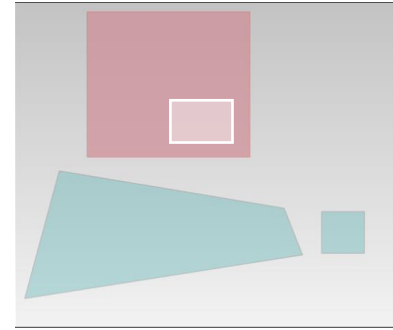
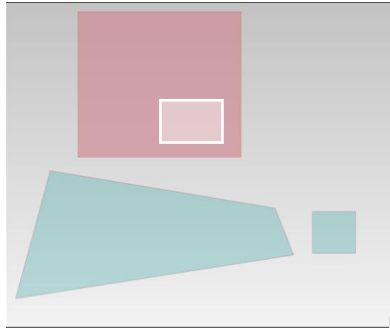


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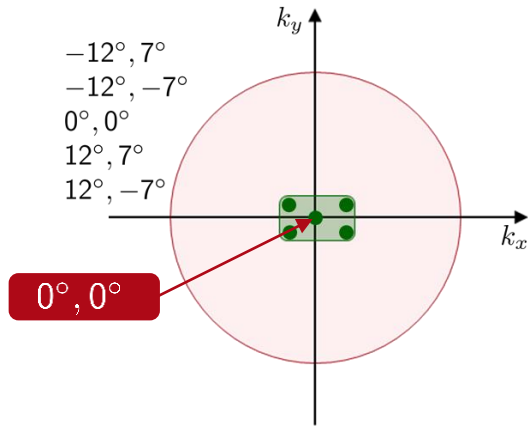
$$\lambda = 530 \text{ nm}$$

$$\Delta\lambda = 0 \text{ nm}, 1 \text{ nm}, 10 \text{ nm}$$

$$r = 1.5 \text{ mm}$$



Intensity Detector: Output View – Temporal Model

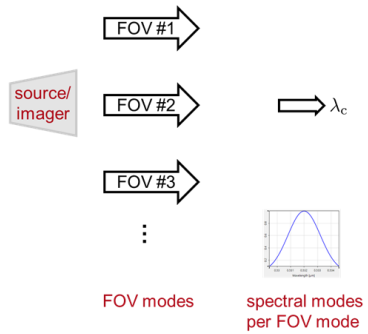
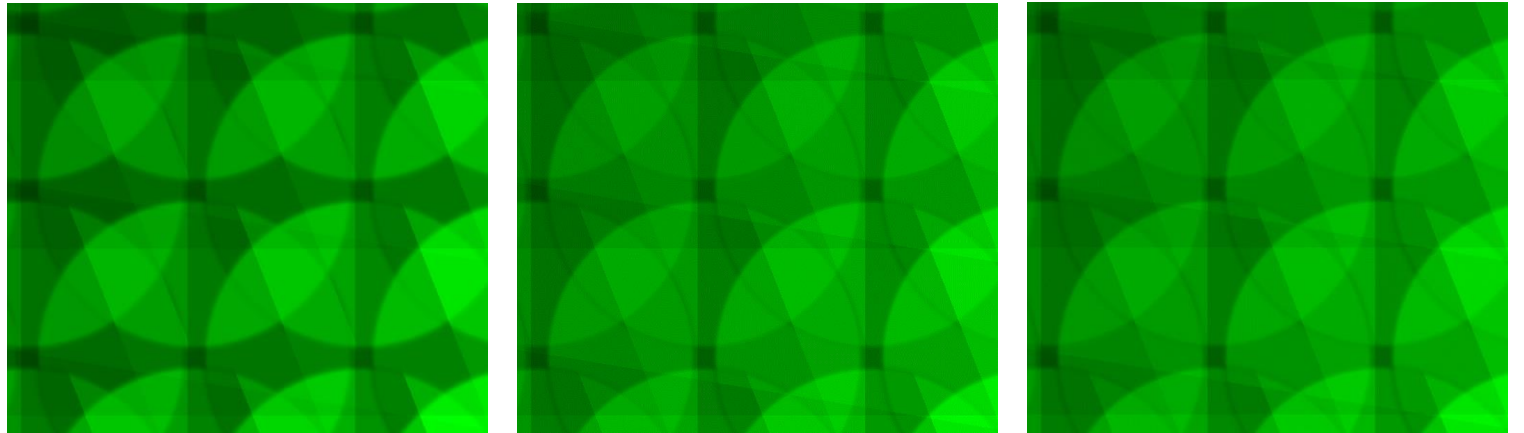
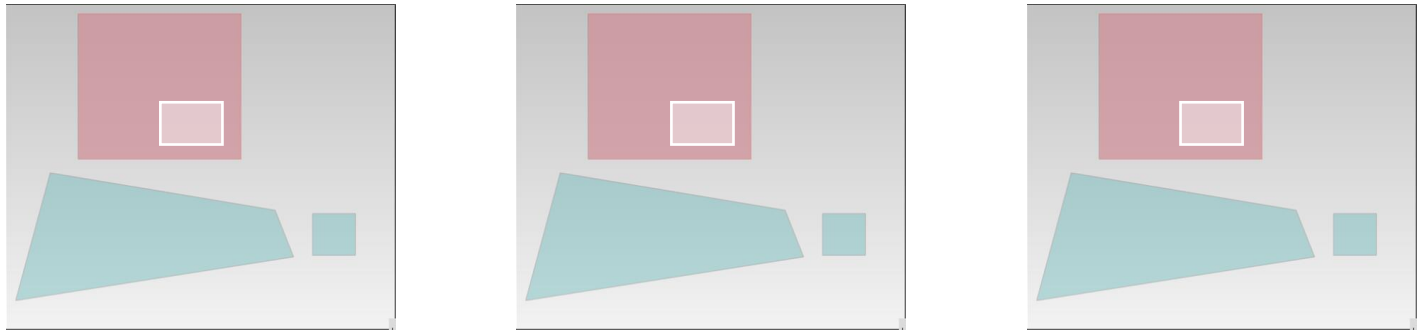


$E_x^{in} = 1, E_y^{in} = 0$

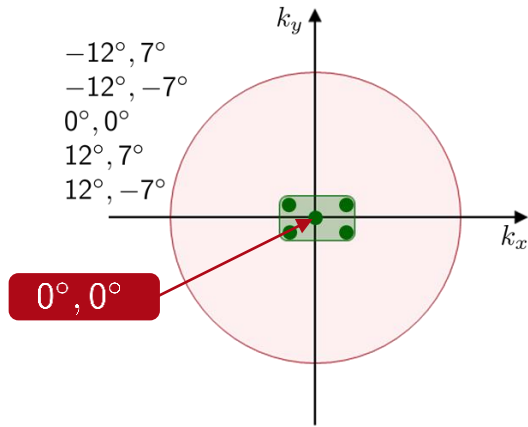
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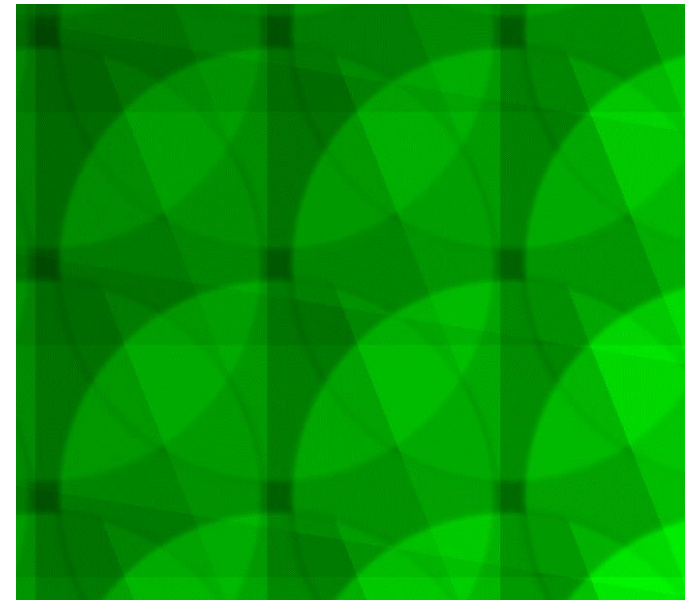
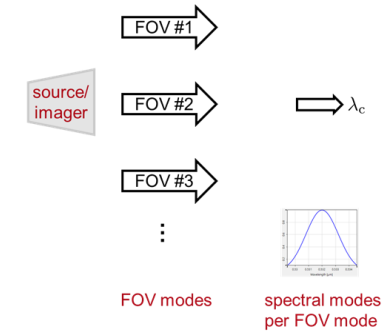
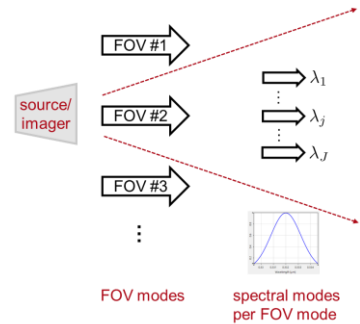


Intensity Detector: Output View - Comparison



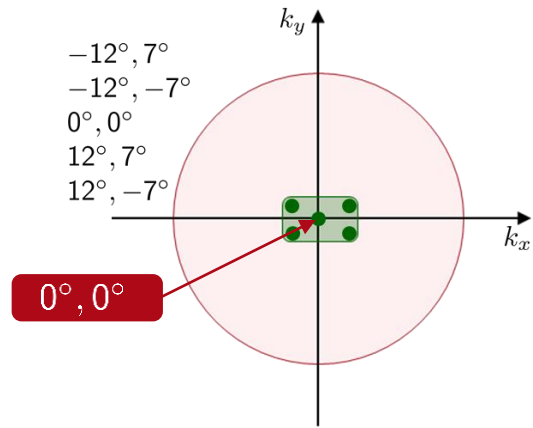
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Temporal model does not include angular dispersion and the resulting shifts of spectral modes.



Diffraction

Intensity Detector: Output View – Comparison

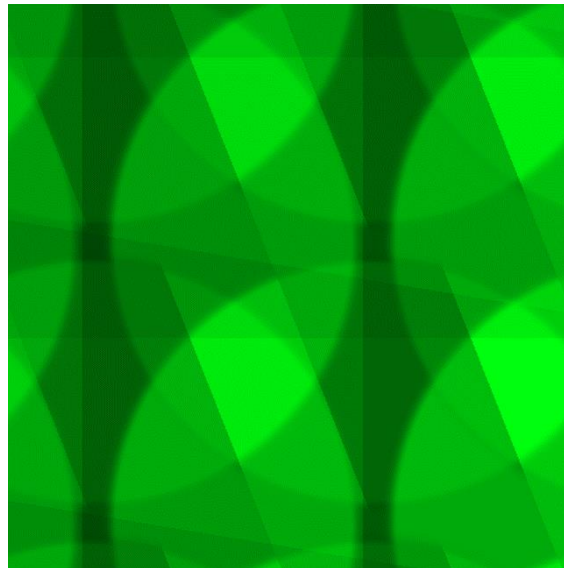
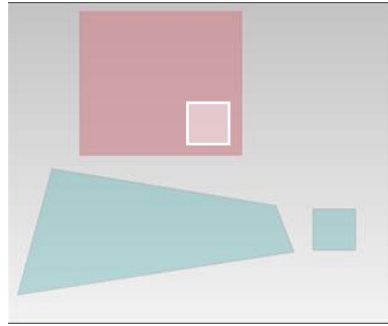


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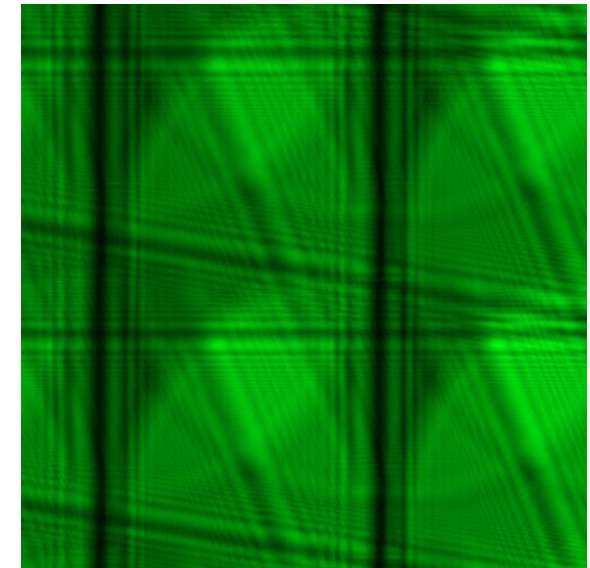
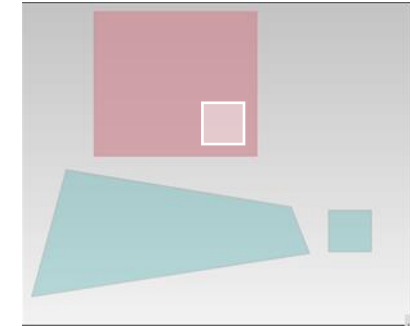
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w/o diffraction



w/ diffraction

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