Pockels effect

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Overview

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- optical medium in an external electric field

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- electro-optic devices

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- not all crystals can have such tensors

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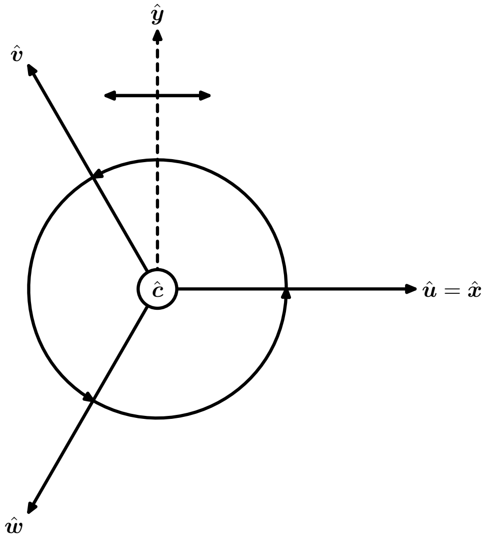
- lithium niobate with 3m symmetry is an example



3m symmetry. There is a mirror plane (m) spanned by $\hat{c}$ and $\hat{y}$ and a three-fold (3) rotation symmetry $\hat{u} \to \hat{v} \to \hat{w} \to \hat{u}$ around the crystallographic axis $\hat{c}$. $\hat{c} \to -\hat{c}$ is not allowed.

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- the Pockels tensor is a linear combination of these four invariant tensors

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- Pockels cell

A Pockels cell with transversal field. It may modulate or switch light in picoseconds.

A Pockels cell with longitudinal field. It requires transparent electrodes.

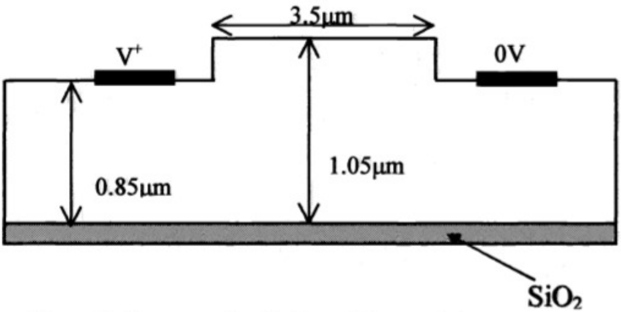
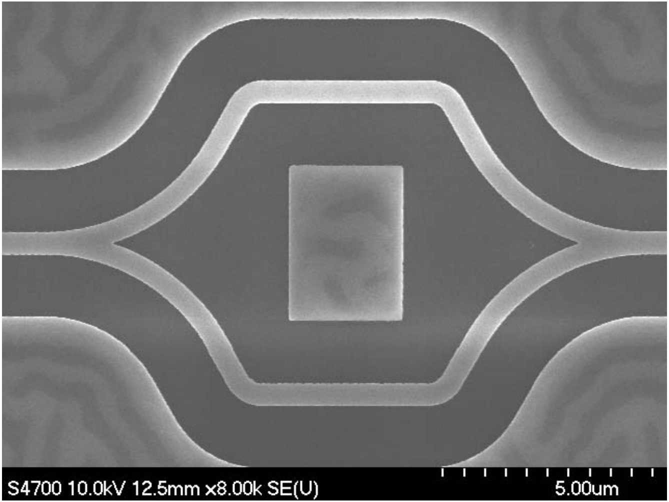


Figure 7. Cross sectional view of the modulator

Integrated modulator with SiC



An integrated Mach-Zehnder interferometer