

Polaritons-the general concept and its application to Semiconductors

Claus Klingshirn

Institut für Angewandte Physik der Universität

Karlsruher Institut für Technologie (KIT)

D 76131 Karlsruhe

Germany

The concept of polaritons is introduced in a general way as the quanta of the mixed state of electromagnetic- and polarization fields in matter. This means that the polariton concept applies, whenever the refractive index is different from one. Examples from various fields and for various spectral ranges are given.

In a next section this concept is applied to bulk semiconductors including phonon-, plasmon- and exciton polaritons and experimental techniques to measure their dispersion. A short detour is devoted to the corresponding surface polaritons.

As a conclusion and outlook we address cavity polaritons in Fabry-Perot cavities and in (ZnO-based) nano- and micro-rods.