PHYSIKALISCHES KOLLOQUIUM

ANTRITTSVORLESUNG

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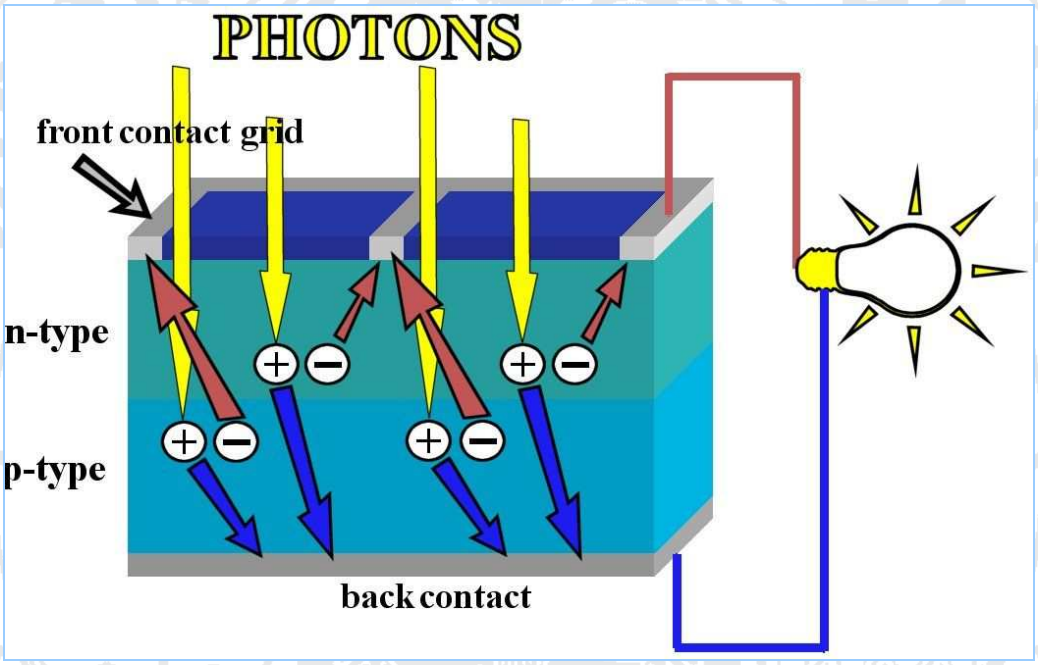
IM GROßEN HÖRSAAL



THE PHYSICS OF SOLAR CELLS

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The purpose of this lecture is to provide an introduction to the physics of the photovoltaic cell, and to explain how a solar cell works. First, I will describe in general terms how light can be converted into electrical power, explain the underlying physical principles and derive fundamental limits for the efficiency of these processes. Then, I will show to what extent these theoretical concepts are presently realized in practical devices, for example commonly used silicon solar cells. Finally, possible strategies for enhancing the efficiency of photovoltaic cells are discussed. One of them might be to consider coherent rather than diffusive transport of the charge carriers generated by the absorption of photons.