

Appunti di Fisica '26

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Sala seminari, CNR-IPCF

Electromagnetic Mode Management in Transparent DMD Electrodes for High Angular Color Stability in White OLEDs

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The integration of photonic structures into optoelectronic devices is a broad and evolving field of research. Recently, great interest has been directed to dielectric/metal/dielectric (DMD) structures, which has been shown to be suitable for replacing ITO electrodes. In this work, DMD structures (consisting of WO₃/Ag/WO₃ layers) were produced via UHV thermal evaporation and used to build a Transparent White Organic Light-Emitting Diode (TWOLED). The optical response in the visible range was studied with Variable Angle Spectroscopic Ellipsometry (VASE), varying the thicknesses of the dielectric layers. VASE data allowed understanding the relation between the transparency degree of the DMD structures and the polarization state of the output light. The electroluminescence spectrum of the p-i-n TWOLED device, which integrates an optimized DMD structure, was investigated. An analysis of the optical modes that contribute to the power dissipation in TWOLED reveals a very large angular stability of the EL signal from TWOLED, with negligible colour coordinates variation in an escaping light visual cone of 120°, thus paving the way for a new generation of transparent white lighting sources.