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Effect of disorder on the lifetime of interface polaritons IGOR SMOLYARENKO, Brunel University, CELESTINO CREATORE, ALEXEI IVANOV, Cardiff University — We study the effects of weak disorder on the lifetime of interface polaritons in quantum wells (QWs) associated with in- plane free QW excitons. In ideal quantum wells, the interface light is evanescent, i.e., it is localized in the z direction (QW growth direction) and is thus invisible at macroscopic distances from the QD plane. However, randomness in the structure of QWs leads to finite radiative lifetimes of the interface light modes which makes them "visible" in time- resolved light scattering experiments. We study the distribution of the delay times for scattering of bulk photons off the two- dimensional interface layer at finite incidence angle. While the bulk of the distribution corresponds to the usual threshold effect, the tail of the distribution at long delay times is governed by the quasi-resonant long-lived interface light modes which are essentially the disorder-degraded remnants of the evanescent waves in ideal QWs. These modes are analogous in some ways to the anomalously localised states in two-dimensional disordered electronic systems. Time-resolved spectroscopy of weakly disordered QWs is thus shown to be an effective tool for probing the "hidden" optics of the interface polaritons.

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