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On the excitation of surface plasmon polariton in homogeneous left-handed materials RABIA MOUSSA, Ames Laboratory-USDOE, Iowa State University, Ames, Iowa 50011, COSTAS SOUKOULIS, Iowa State University — Results of the excitation of the surface plasmon polariton (SPP) in homogeneous left-handed materials (LHM) are presented. The role of the evanescent waves in exciting and enhancing the transmission is examined. It is demonstrated that, within the attenuated total internal reflection geometry as well as with a line source, the evanescent waves excite the SPPs at the Air/LHM interface. The negative medium amplifies their magnitude and consequently enhances their transmission. The SPP's are excited in the first interface and facilitate the energy transfer to the second interface. Once the steady state time is reached, only the SPP's at the second interface are excited assuring an amplification of the evanescent waves inside the medium. As expected a system with $n = -1$ at the matching condition focuses the image in better way compared to other cases when the ratio between the permeability and the permittivity of the material differs from 1. Therefore, the image is restored with the evanescent modes as well as with the propagating modes. The case of photonic crystals is also examined.

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