Electromagnetic Stress at the Boundary: Photon Pressure or Tension?

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Light carrying momentum $\hbar\mathbf{k}$ exert a positive photon pressure on an object in vacuum. But in a negative refractive medium the wave vector k is directed towards the source of radiation, in this case should light insert a photon "tension" instead of a photon pressure? By employing an *ab initio* method that takes into account the underlying microstructure of a material, we show that the electromagnetic stress at the boundary is in fact indeterminate if only the macroscopic permittivity and permeability of the material are specified. Whether light pulls or pushes the boundary depends also on the microscopic lattice symmetry of the polarizable units that constitute the medium. Within the context of effective medium theory, the lattice symmetry is attributed to electrostriction and magnetostriction which can be accounted for by the Helmholtz stress tensor.