

Bound States in the Continuum in a Wire Medium

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We show that a slab of wire medium composed of thin parallel metallic wires can naturally support bound states in the continuum (BICs) formed in an unusual way. The revealed BICs appear due to the strong spatial dispersion making possible the propagation of longitudinal plasma-like waves and TEM polarized modes with a flat band. The symmetry-protected (at- Γ) BICs are formed due to the polarization mismatch between the longitudinal plasma-like waves and transversal plane waves in the surrounding space, while the accidental (off- Γ) BICs appear as a result of the destructive interference between bulk TEM and plasma modes. All revealed BICs can be well-described analytically without the use of the Bloch theorem within effective medium approximation when the wire medium behaves as homogeneous 1D anisotropic plasma with strong spatial dispersion.