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Physical effects near a wormhole

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One of the features of general relativity is the possible existence of space-time with a nontrivial topological and casual global structure . The real three-dimensional space might in principle be multiply connected and there might exist wormholes in it. The presence of a wormhole leads to the appearance of corrections to the Coulomb law. In the present work, an exact solution of the Laplace equation for a flat space with a wormhole whose mouths are spheres is found. It is shown that a point charge is attracted to the wormhole at all points in space except for the plane of symmetry. An analogy is noted between the attraction of a charge to the mouth of a wormhole and the attraction of a charge to a polarizable body. A freely moving charge experiences acceleration due to the presence of attraction to the mouth of a wormhole, which leads to the appearance of electromagnetic radiation. The paper presents estimates of the power of electromagnetic radiation for a charge flying near the mouth of a wormhole. The motion of the mouth through the plasma leads to the appearance of inhomogeneities in the distribution of matter and can serve as an additional source of cosmological disturbances that significantly affect the rate of formation of galaxies.

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