

Wormholes without exotic matter in Eddington-inspired Born-Infeld gravity

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Abstract

It is well-known that wormholes in general relativity need energy-condition-violating (exotic) matter to support them. In contrast, we show that this is not the case in Eddington-inspired Born-Infeld (EiBI) gravity in general, by analyzing both the null convergence condition and the null energy condition along a congruence of radial null rays passing through a wormhole. We then obtain exact solutions of the field equations in EiBI gravity coupled to arbitrary nonlinear electrodynamics and anisotropic fluids. Our general solutions represent both wormholes and black holes, depending on the signs and values of different parameters. We analyze the wormhole solutions in detail and show that they are supported by nonexotic matter. As special cases of our general solutions, we work out some specific examples by considering different form of matter.

References

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