Spectral lines of asymmetric wormholes

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We investigate the scalar absorption spectrum of wormhole solutions constructed via the recently developed thin-shell formalism for Palatini *f(R)* gravity. Such wormholes come from the matching of two Reissner-Nordström spacetimes at a time-like hypersurface (shell), which, according to the junction conditions in Palatini *f(R)*, can be stable and have either positive or negative energy density. In particular, we identified a new physically interesting configuration made out of two overcharged Reissner-Nordström spacetimes, whose absorption profile departs from that of black holes and other previously considered wormholes in the whole range of frequencies. Unlike in symmetric wormhole solutions, the asymmetry of the effective potential causes the dilution of the resonances associated to the quasibound states for the high-frequency regime. Therefore, slight asymmetries in wormhole space-times could have a dramatic impact on the observable features associated to resonant states.

Keywords: Scalar absorption spectrum; wormhole; quasibound states.