



## TRAVERSABLE WORMHOLES AND LIGHT RINGS

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Ultracompact objects (UCOs) are horizonless compact objects that present light rings (LRs) - circular photon orbits. As a result, they could be black hole mimickers. Some years ago, Cunha et al. established a theorem stating that, under general assumptions, UCOs formed from smooth, quasi-Minkowski initial data, must have at least a pair of LRs, one of which must be stable. These stable LRs are supposed to trigger a non-linear instability in spacetime, potentially weakening UCOs' ability to replicate black hole phenomenology. However, this LR theorem does not extend to wormholes, which represent topologically nontrivial spacetimes. We address the wormhole case by proving the following theorem: a stationary, axisymmetric, asymptotically flat, traversable wormhole in 1+3 dimensions, connecting two different asymptotic regions, has at least one standard LR for each rotation sense. Thus, any (such) wormhole is an UCO. By filling this gap, our results not only broaden the horizon of knowledge on UCOs but also highlight their potential to closely mimic black hole phenomenology.