



Hyperbolic metamaterial interfaces: Hawking radiation from Rindler horizons and the "end of time"

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Extraordinary rays in a hyperbolic metamaterial behave as particle world lines in a three dimensional (2+1) Minkowski spacetime. We analyze electromagnetic field behavior at the boundaries of this effective spacetime depending on the boundary orientation. If the boundary is perpendicular to the space-like direction in the metamaterial, an effective Rindler horizon may be observed which produces Hawking radiation. On the other hand, if the boundary is perpendicular to the time-like direction an unusual physics situation is created, which can be called "the end of time". It appears that in the lossless approximation electromagnetic field diverges at the interface in both situations. Experimental observations of the "end of time" using plasmonic metamaterials confirm this conclusion.

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