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Can Light Cross a Singularity? Exact Solutions from Analogue Gravity

Using a simple spacetime that hosts a naked singularity, we employed an analogue gravity model to study electromagnetic fields in this background. Remarkably, we found that there are exact solutions to the full set of electrostatic and electrodynamic equations that remain regular, even in the presence of the singularity. Moreover, some of these solutions exhibit a perfectly well-behaved, bounded power flux as they propagate towards the singularity, suggesting the possibility of having electromagnetic energy transference through it.

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