

Time-domain metamaterial models and finite element simulations

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In this talk, we first introduce the development history of metamaterials and present some time-domain metamaterial models to simulate negative refraction phenomenon, zero index metamaterials and optical black holes. Then, we focus on the time-domain cloak models. The explicit expressions of the cloak parameters without the contour curve expressions of the objects and 2d arbitrary shape cloak model are established. A new time-domain finite element scheme is developed to solve the governing equations, and its stability is also provided. Numerical results are presented to confirm the theoretical analysis and the effectiveness of our cloak model and FETD method.