

数学与系统科学研究院

计算数学所学术报告

报告人: **Prof. Ganquan Xie**

(*GL Geophysical Laboratory, USA*)

报告题目:

**Novel Practicable GLLH EM
Invisible Cloak With Refractive
Index $N > 1$ And GL No Scattering
Inversion**

邀请人: 张文生副研究员

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计算数学所报告厅

Novel Practicable GLLH EM Invisible Cloak With Refractive Index $N > 1$ And GL No Scattering Inversion

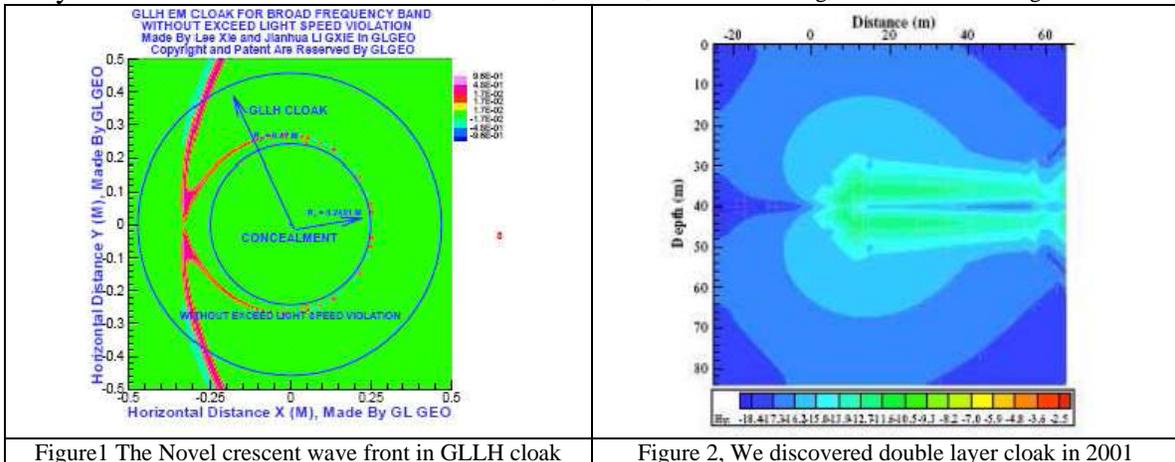
Ganquan Xie, Jianhua Li, Feng Xie, Lee Xie
 GL Geophysical Laboratory, USA, <http://www.glgeo.com>

Abstract

In this paper, we propose a novel Global and Local (GL) electromagnetic (EM) invisible cloaks with refractive index $N(r) > 1$. In 2001, we discovered a double cloak in Figure 2 in [1]. Then we discovered the GLLH EM invisible cloak [2]. Our GLLH EM invisible cloak is discovered from GL modeling and GL No scattering inversion and searched on a distinctive material class.

$a_{\alpha\beta} \log^{\alpha} (b_{\alpha\beta} / h) h^{\beta}$. So, it is called GLLH Cloak. The GLLH EM invisible cloak has refractive index $N(r) > 1$, it has finite speed and has no exceed light speed violation. The GLLH EM cloak no scattering inversion and electromagnetic integral equation for cloak are presented in other paper. The novel EM wave propagation and front branching in the GLLH cloak by GLLH EM modeling and no scattering inversion are presented in this paper. The EM wave front propagation in GLLH cloak is behind of the front in free space. That shows that the GLLH EM invisible cloak has refractive index $N(r) > 1$, has finite speed and has no exceed light speed violation. At time steps $118 dt$, in the GLLH cloak, the wave front is curved as a crescent like and propagates slower than the light in free space. At the time step $119 dt$, the EM wave inside of the GLLH cloak propagates slower than light speed, in particular, its two crescent front peaks intersect at a front branching point. At the front branching point, the front is split to two fronts. One is forward propagation front with most energy and without exceed light speed, other one is attracting wave front to the inner boundary with small energy and amplitude decay to zero and with speed decay to zero. The novel front branching and crescent like wave propagation are displayed in the following figure 1, and figures 5 -20 in this paper. The GLLH EM cloaks can be practicable by using conventional materials in all broad frequency band. GLLH cloak patent and copyright are belong to GL Geophysical Laboratory, USA.

Keywords: GLLH cloak with refractive index $N > 1$, invisible, GL EM modeling, GL EM no scattering inversion



[1] Li, J., G. Xie, C. Lin, J. Liu, "2.5 dimensional GILD electromagnetic modeling and application," SEG, Expanded Abstracts, Vol. 21, No. 1, 692-695,

[2] Ganquan Xie, Jianhua Li, Lee Xie, Feng Xie, GLLH EM invisible cloak with novel front branching and without exceed light speed violation, arxiv:1005.3999v1 [physics.optics], may, 2010, <http://arxiv.org/abs/1005.3999v1>

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謝千权 Ganquan Xie
GLGANQUAN@GLGEO.COM

1991-2001 Staff Scientist, Lawrence Berkeley National Laboratory

2002 – Present, Senior Scientist, GL Geophysical Laboratory, <http://www.glgeo.com>

Fellow member, The Electromagnetic Academy, USA

Xie has organized 50 sessions in International Electromagnetic Conferences.

Xie is a leader of computational electromagnetics in the world. In www.google.com to search “Ganquan Xie”

Xie and his colleagues discovered

1. Novel Electromagnetic Invisible GLLH Cloak with refractive index $N > 1$ the 光学电磁隐形材料
GLLH cloak can be practicable by conventional optical materials.

<http://arxiv.org/abs/1005.3999v1>

2. There is no electromagnetic field can be excited by source inside concealment

<http://arxiv.org/abs/0904.3040>

If the concealment is cloaked by single layer cloak.

- 3 Novel GLLH double layer electromagnetic cloak.

<http://arxiv.org/abs/1002.4249>

<http://arxiv.org/abs/0907.0858>

- 4 Novel acoustic complete mute cloak. 声学静音材料

- 5 Novel elastic mechanical cloak to prevent Earthquake and vibration. 完全防地震篷罩材料

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