

## 碳纤维增强复合材料脉冲涡流无损检测仿真与实验研究

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摘要：

采用有限元仿真软件对脉冲涡流矩形传感器两种放置方式进行了建模与仿真分析，综合比较水平与竖直放置两种方式的检测效果，由于水平放置时，y轴方向的磁场分量大于竖直放置的z轴分量，相同尺寸的矩形传感器水平放置检测时，长宽比越大，检测效果越好。采用水平放置方式下的矩形探头对碳纤维增强复合材料进行了电导率分布与缺陷检测实验，实验证实脉冲涡流矩形传感器能够有效检测碳纤维增强复合材料的电导率分布与缺陷。

关键词：脉冲涡流；有限元分析；方向特性；碳纤维增强复合材料

## Simulation and experiments on the carbon fiber reinforced composite Using Pulsed Eddy Current Testing

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**Abstract:**

Pulsed eddy current (PEC) testing technology is a burgeoning electromagnetic nondestructive testing technology. There are certain restrictions on detection of anisotropy of metal materials using pulsed eddy current circular probe. However, the rectangular probe has some advantages. The finite model of rectangular probe using COMSOL is built. The directional characteristics of the rectangular probe are simulated based on horizontal and perpendicular location. The results show that the directional characteristics are obvious. The conclusion will provide some references on defect and stress detection of rectangular probe.

**Keywords:** Pulsed Eddy Current; finite element analysis; directional characteristics; carbon fiber reinforced composite

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