**基础物理实验原始数据记录**

实验名称 磁场的测量 地点 教学楼708

学生姓名 学号 分班分组座号 - - 号（例：1-04-5号）

实验日期 年 月 日 成绩评定 教师签字

注意：如设备霍尔电流最大值不能达到讲义要求的值，在设备无故障的情况下，可调整取样间隔。

表1霍尔电压VH与工作电流Is数据记录

VH—IS IM =200mA

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Is(mA) | V1(mV) | V2(mV) | V3(mV) | V4(mV) | (mV) |
| +IM +Is | +IM -Is | -IM -Is | -IM +Is |
| 0 |  |  |  |  |  |
| 0.50 |  |  |  |  |  |
| 1.00 |  |  |  |  |  |
| 1.50 |  |  |  |  |  |
| 2.00 |  |  |  |  |  |
| 2.50 |  |  |  |  |  |
| 3.00 |  |  |  |  |  |

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表2霍尔电压VH与励磁电流IM 数据记录（VH—IM，IS =1.00mA）

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IM(mA) | V1(mV) | V2(mV) | V3(mV) | V4(mV) | (mV) |
| +IM +Is | +IM -Is | -IM -Is | -IM +Is |
| 0 |  |  |  |  |  |
| 50 |  |  |  |  |  |
| 100 |  |  |  |  |  |
| 150 |  |  |  |  |  |
| 200 |  |  |  |  |  |
| 250 |  |  |  |  |  |
| 300 |  |  |  |  |  |

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表3磁感应强度B与励磁电流IM数据记录

B—IM IS =1.00mA

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IM(mA) | B1(mT) | B2(mT) | B3(mT) | B4(mT) | (mT) |
| +IM +Is | +IM -Is | -IM -Is | -IM +Is |
| 0 |  |  |  |  |  |
| 50 |  |  |  |  |  |
| 100 |  |  |  |  |  |
| 150 |  |  |  |  |  |
| 200 |  |  |  |  |  |
| 250 |  |  |  |  |  |
| 300 |  |  |  |  |  |

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表4 电磁铁磁场沿水平方向分布数据记录（IM=200mA）

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| X/ｍｍ |  | 42 | 40 | 38 | 36 | 34 | 32 | 30 |
| B/mT |  |  |  |  |  |  |  |  |
| X/ｍｍ | 28 | 26 | 24 | 22 | 20 | 18 | 16 |  |
| B/mT |  |  |  |  |  |  |  |  |

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表5 AC模式霍尔效应测量磁场（IS-AC=1mA）

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| IM(mA) | 50 | 75 | 100 | 125 | 150 | 175 | 200 |
| B/mT |  |  |  |  |  |  |  |
| VH-AC/mV |  |  |  |  |  |  |  |

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表6 圆电流线圈轴线上磁场分布测量数据记录

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 轴向距离X（mm） | -25 | -20 | -15 | -10 | -5 | 0 | 5 | 10 | 15 | 20 | 25 |
| Umax（mV） |  |  |  |  |  |  |  |  |  |  |  |
| 测量值：（mT） |  |  |  |  |  |  |  |  |  |  |  |
| 计算值：（mT） |  |  |  |  |  |  |  |  |  |  |  |
| f = 120Hz, I = 60mA, N0 = 400, R = 105mm | | | | | | | | | | | |

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表7 亥姆霍兹线圈轴线上磁场分布测量数据记录

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 轴向距离X（mm） | -25 | -20 | -15 | -10 | -5 | 0 | 5 | 10 | 15 | 20 | 25 |
| Umax（mV） |  |  |  |  |  |  |  |  |  |  |  |
| 测量值：（mT） |  |  |  |  |  |  |  |  |  |  |  |
| f = 120Hz, I = 60mA | | | | | | | | | | | | |

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表8 亥姆霍兹线圈磁场径向分布测量数据记录

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 径向距离X（mm） | -25 | -20 | -15 | -10 | -5 | 0 | 5 | 10 | 15 | 20 | 25 |
| Umax（mV） |  |  |  |  |  |  |  |  |  |  |  |
| 测量值：  （mT） |  |  |  |  |  |  |  |  |  |  |  |
| f = 120Hz, I = 60mA | | | | | | | | | | | | |

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表9 探测线圈转角与感应电压数据记录（注意0度的设置方式）

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 探测线圈转角θ | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 |
| U（mV） |  |  |  |  |  |  |  |  |  |  |
| 计算值： |  |  |  |  |  |  |  |  |  |  |
| 探测线圈转角θ | 100 | 110 | 120 | 130 | 140 | 150 | 160 | 170 | 180 | 190 |
| U（mV） |  |  |  |  |  |  |  |  |  |  |
| 计算值： |  |  |  |  |  |  |  |  |  |  |
| 探测线圈转角θ | 200 | 210 | 220 | 230 | 240 | 250 | 260 | 270 | 280 | 290 |
| U（mV） |  |  |  |  |  |  |  |  |  |  |
| 计算值： |  |  |  |  |  |  |  |  |  |  |
| 探测线圈转角θ | 300 | 310 | 320 | 330 | 340 | 350 | 360 |  |  |  |
| U（mV） |  |  |  |  |  |  |  |  |  |  |
| 计算值： |  |  |  |  |  |  |  |  |  |  |
| f = 120Hz, I = 60mA | | | | | | | | | | | |

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表10 励磁电流频率对磁场强度的影响

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 励磁电流频率f（Hz） | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 |
| Umax（mV） |  |  |  |  |  |  |  |  |  |  |  |
| 测量值：（mT） |  |  |  |  |  |  |  |  |  |  |  |
| I=60 mA (注意：始终保持在60mA) | | | | | | | | | | | |

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