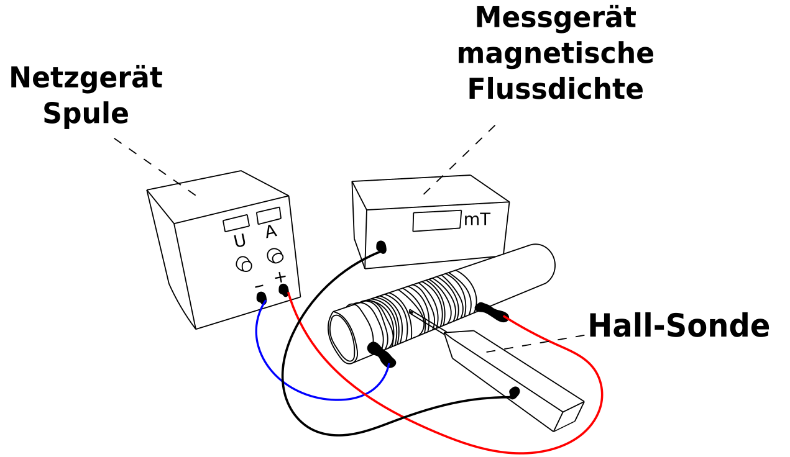
**Arbeitsblatt - Magnetfeld im Inneren einer langen Spule**

**Aufbau und Durchführung**

Man schließt eine Spule, deren Länge man variieren kann, an ein Netzgerät an. Die stromdurchflossene Spule besitzt ein Magnetfeld. Mit einer Hall-Sonde untersucht man die magnetische Feldstärke B im Inneren der Spule.

**a)** In einer ersten Versuchsreihe lässt man die Länge L und die Windungszahl n der Spule konstant und verändert nur die Stromstärke I.

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| **Stromstärke I in Ampere** |  |  |  |  |  |  |  |  |  |  |  |
| **Magnetische Flussdichte B in mT** |  |  |  |  |  |  |  |  |  |  |  |

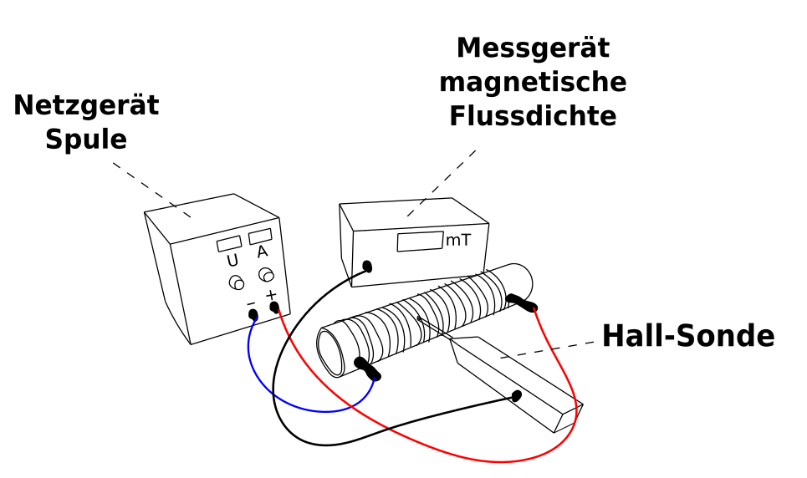
Zeichnen Sie ein Stromstärke-Magnetische Flussdichte -Diagramm.

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**Ergebnis**

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**b)** In einer zweiten Versuchsreihe lässt man die Stromstärke I und die Windungszahl n konstant und verändert die Spulenlänge (durch Streckung der Spule).

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| **L [in m]** | **B [in mT]** |
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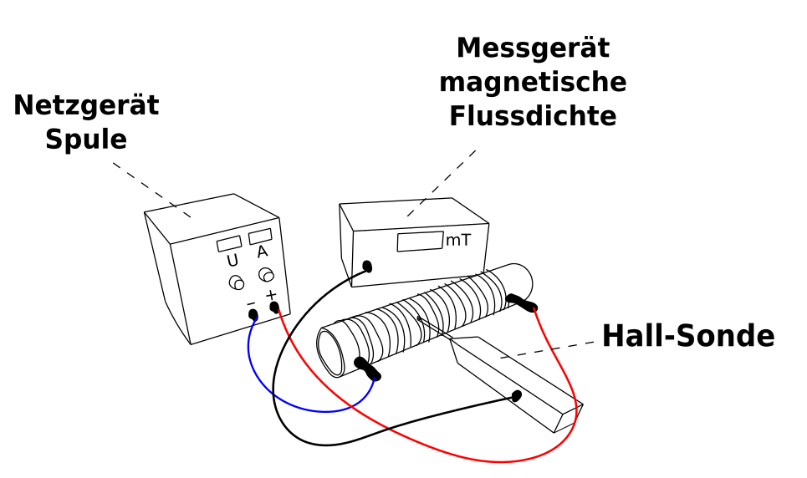
Zeichnen Sie ein Länge-Magnetische Flussdichte -Diagramm.

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**c)** In einer dritten Versuchsreihe lässt man die Stromstärke I und die Spulenlänge konstant und verändert nur die Windungsanzahl n.

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| **n** | **B [in mT]** |
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Zeichnen Sie ein Windungszahl-Magnetische Flussdichte -Diagramm.

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**Ergebnis**

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Rechnet man

erhält man eine Proportionalitätskonstante. Diese Proportionalitätskonstante ist die magnetische Feldkonstante (Literaturwert: µ0 = 1,2566 · 10-6 Tm/A).

Die Permeabilitätszahl beträgt bei den meisten Stoffen (wie zum Beispiel der Luft) μr = 1. Für Eisen ist diese Zahl wesentlich höher. Die magnetische Feldstärke B im Inneren einer eisenlosen (langen) Spule beträgt:

