LICENSING OPPORTUNITY: GATELESS P-N JUNCTION METROLOG

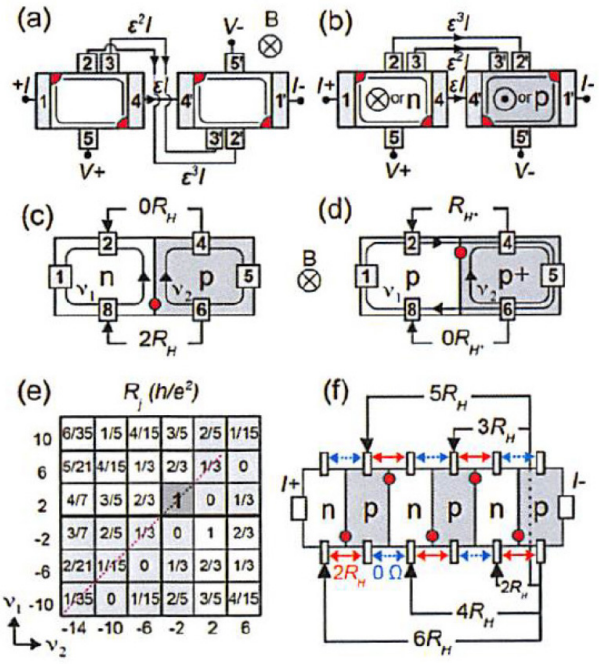
DESCRIPTION

Problem

This solves problems of ohm dissemination and reduces the chain of calibration.
Limit: device sizes of 1 cm.

Invention

This invention utilizes the unique properties of graphene to build p-n junctions working in the quantum Hall regime that allow convenient resistance scaling. This device would provide more than one value of resistance traceable to the quantum Hall effect. A graphene device capable of achieving many values of quantized resistances.



Triple series connection scheme of two Hall bars in standard configuration (a), and for the case of opposite magnetic field or carrier type (b). Note that in (b) crossings of the wire leads can be avoided. Areas of high current density ('hot spots') are marked in device corners; lines within the Hall bars denote equi-potential lines. (c) Directly connected Hall bars with bipolar filling (c) and unipolar, but unequal filling (d). In (c) and (d) lines denote edge states, not equi-potential lines. (e) Theoretical resistance values calculated for samples (c) or (d). (f) Schematic diagram of the graphene p-n junction series array.

BENEFITS

Commercial Application

Invention would offer different values of resistances with similar precision as the currently existing available standards.

Competitive Advantage

This option reduces the need for bulky equipment and, by simplifying the calibration chain, can improve resistance uncertainties.

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