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(54) Title: SPIN LOGIC BASED ON PERSISTENT SPIN HELICES

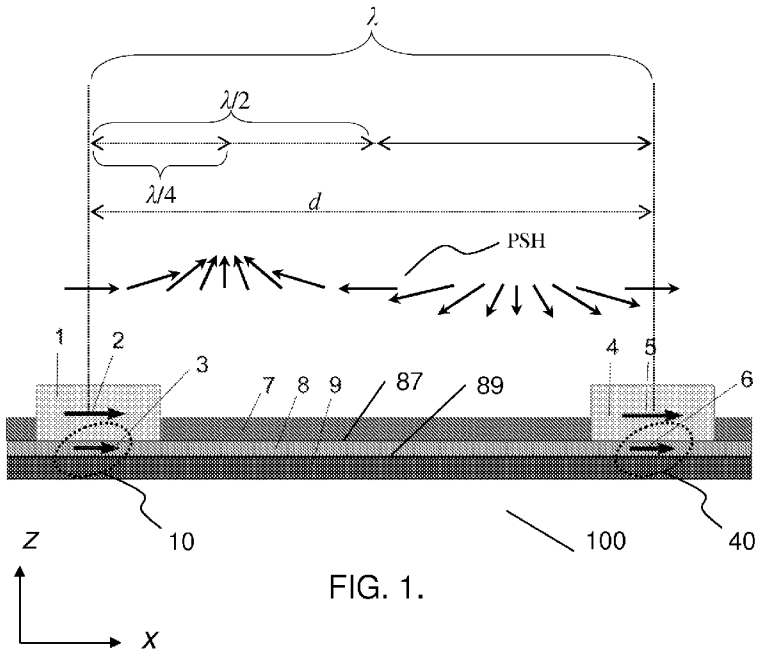


FIG. 1.

(57) Abstract: The present invention is notably directed to spin logic devices (100) and related methods. The devices (100) comprise: an electron confinement layer (8, 87, 89) confining an electron gas or 2DEG in a two- dimensional area subtended by a direction *x* and a direction *y*, the latter perpendicular to the former, the spin logic device configured for the 2DEG to support a persistent spin helix or PSH formed therein with a given spin component oscillating with periodicity λ along direction *x* but not oscillating along direction *y*; and a majority logic circuit (14), said circuit comprising: one or more input devices (1, 1a, 1b, 1c, 1c1, 1c2, 1d), energizable to create respective local spin-polarizations (3) of the 2DEG in respective first regions (10) of the confinement layer, such as to form respective PSHs; and an output device (4), configured to detect, in a second region (40) of the confinement layer, an average spin-polarization (6) of the 2DEG resulting from one or more local spin-polarizations (3) created by the one or more input devices and diffused through one or more resulting PSHs, respectively, wherein a projection of a distance (*d*) between the second region (40) and any one of the first regions (1) onto said direction *x* is equal to $n\,\lambda/a$, n integer, *a* equal to 2 or 4.

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