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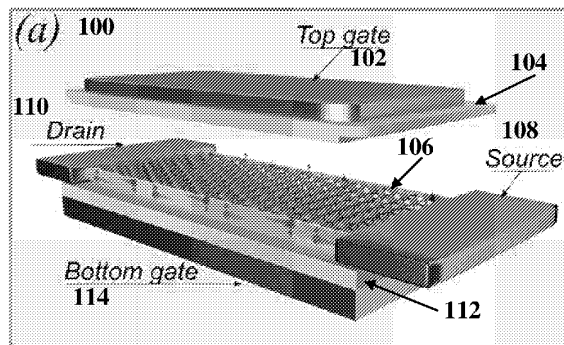
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(54) Title: TOPOLOGICAL QUANTUM FIELD EFFECT TRANSISTOR

Figure 1



(57) Abstract: Disclosed herein is a structure comprising: a gate electrode, a dielectric layer, and a planar layer of a topological material being separated from the gate electrode by at least the dielectric layer, and having a contact interface with the dielectric layer to generate an electric field-controlled Rashba spin-orbit interaction on application of an electric field thereto, wherein the topological material exhibits a topological phase transition between a trivial state and a non-trivial state at a critical electric field strength on application of the electric field, wherein the gate electrode is configured to apply the electric field across the planar layer in a direction perpendicular to a plane of the planar layer; and wherein the topological material exhibits a change in bandgap, in the presence of the electric field, having a spin-dependent contribution represented by a proportionality constant αR and a non-spin-dependent contribution represented by a proportionality constant αv ; and wherein $\alpha R > \alpha v/3$.

[Continued on next page]

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