CLAIMS

1. A layer (100) comprising a topological insulator, the layer (100) comprising:

an arrangement (120) of a plurality of patterns on a surface of the layer (110), wherein the surface (110) is a first main surface (110) extending in first and second directions (D1, D2), each pattern (130) of the plurality of patterns comprising at least a resonant nanostructure having a dimension extending in a plane that is formed by the first and second directions (D1, D2), wherein the pattern (130) is configured to enhance a photocurrent generated from the topological insulator which is depending on a helicity of circularly polarized optical excitation.

2. The layer (100) of claim 1, wherein the first and second directions (D1, D2) are perpendicular to each other and to a thickness direction (D3) of the layer (100).

3. The layer of claim 2, wherein each pattern (130) comprises a pattern portion arranged on a second main surface (112).

4. The layer (100) of any one of claims 1 to 3, wherein each pattern (130) comprises a surface recess (141, 142) and wherein a thickness of the pattern (130) is a depth (151, 152) of the surface recess (141, 142).

5. The layer (100) of any one of claims 1 to 3, wherein each pattern (130) comprises a surface protrusion (143, 144) and wherein a thickness of the pattern (130) is a height (153, 154) of the surface protrusion (143, 144).

6. The layer (100) of any one of claims 1 to 5, wherein each pattern (130) comprises uniform thickness along the dimension of the pattern (130).

7. The layer (100) of any one of claims 1 to 5, wherein each pattern (130) comprises varying thickness along the dimension of the pattern (130).

8. The layer (100) of any one of the previous claims, wherein each pattern (130) comprises a chirality.

9. The layer (100) of claim 8, wherein the chirality is present under an oblique angle.

10. The layer (100) of claim 8 or claim 9, wherein the chirality is present under a normal angle.

11. The layer (100) of any one of the previous claims, wherein the arrangement (120) forms a lattice, for example, a square lattice.

12. The layer (100) of any one of the previous claims, wherein the pattern comprises or is an L-shape.

13. The layer (100) of any one of the previous claims, wherein the pattern comprises or is a square.

14. The layer (100) of any one of the previous claims, wherein each pattern (130) is configured to resonantly increase optical absorption at a resonant wavelength compared to a pattern free and otherwise identical layer.

15. The layer (100) of any one of the previous claims, wherein an absorption and/or a photocurrent depends on the helicity of circularly polarized optical excitation at an oblique angle.

16. The layer (100) of any one of the previous claims, wherein an absorption and/or a photocurrent depends on the helicity of circularly polarized optical excitation at a normal angle.

17. The layer (100) of any one of the previous claims, wherein the topological insulator comprises transitional metal chalcogenides.

18. The layer (100) of any one of the previous claims, wherein the topological insulator comprises Bi, Sb, Te, and Se.

19. The layer (100) of claim 17 or claim 18, wherein the topological insulator is $Bi_{1.5}Sb_{0.5}Te_{1.8}Se_{1.2}$.

20. An electronic device (200) comprising the layer (100) comprising a topological insulator of any one of the previous claims 1 to 19, and further comprising first and second electrodes (210, 220) on the layer (100), wherein the first and second electrodes (210, 220) are configured to provide electrical connection to the layer (100).

21. The electronic device (200) of claim 20, wherein the first and second electrodes (210, 220) are disposed apart from each other on the first main surface of the layer (100).

22. The electronic device (200) of claim 20 or claim 21, wherein the layer (100) is monocrystalline.

23. A method (300) of controlling spin transport in the layer (100) comprising a topological insulator of any one of the previous claims 1 to 19, the method (300) comprising:

applying (310) circularly polarized light on the layer (100); and

driving (320) an electronic component (50) with a photocurrent produced in the layer (100) by the circularly polarized light.

24. A use of the layer (100) comprising a topological insulator of any one of the previous claims 1 to 19 in an electronic device (200), wherein the electronic device (200) is selected from: a polarization sensitive photodetector; a spin polarized photodetector; a device for measuring molecular chirality; a quantum opto-spintronic device for transferring of polarization and entanglement from photons to electron spins.