CLAIMS

1. An ablation device for pulsed field ablation of a tissue by pulsed electric field, the device comprising:

a catheter configured for insertion into a heart of a patient comprising a set of electrodes; and

a pulse generator configured to generate electric pulses, the pulse generator electrically coupled to the set of electrodes;

wherein the set of electrodes is configured to provide pulsed electric fields from the electric pulses causing ablation of a tissue within the heart of the patient;

wherein the set of electrodes comprises a first electrode configured for operation in a mode of a first polarity, a second electrode configured for operation in a mode of a second polarity different than the first polarity, and a third electrode configured for operation in a mode of a state of high impedance; and

wherein the set of electrodes comprises at least one electrode configured to be switched between at least two of the modes during an ablation.

2. The ablation device according to claim 1, wherein

the third electrode is configured for operation in a mode of a state of impedance higher than 500 Ω.

3. The ablation device according to claim 1, wherein

a ratio of a surface area of the first electrode to a surface area of the second electrode is in a range from 2:3 to 1:100.

4. The ablation device according to claim 1, wherein

the set of electrodes comprises at least two second electrodes configured for operation in the mode of the second polarity different than the first polarity.

5. The ablation device according to claim 4, wherein

the set of electrodes comprises at least two third electrodes configured for operation in the mode of the state of high impedance.

6. The ablation device according to claim 4, wherein

a ratio of a surface area or sum of the surface areas of the at least one first electrode to a sum of a surface areas of the at least two second electrodes is in a range from 2:3 to 1:100.

7. The ablation device according to claim 1, wherein

the third electrode is spatially adjacent to the first electrode.

8. A catheter for pulsed field ablation of a tissue by pulsed electric field, the catheter configured for insertion into a heart of a patient comprising:

a set of electrodes;

the set of electrodes configured to provide pulsed electric fields causing ablation of a tissue within the heart of the patient;

wherein the set of electrodes comprises a first electrode configured for operation in a mode of a first polarity, a second electrode configured for operation in a mode of a second polarity different than the first polarity, and a third electrode configured for operation in a mode of a state of high impedance; and

wherein the set of electrodes comprises at least one electrode configured to be switched between at least two of the modes during an ablation.

9. The catheter according to claim 8, wherein

the third electrode is configured for operation in a mode of a state of impedance higher than 500 Ω.

10. The catheter according to claim 8, wherein

a ratio of a surface area of the first electrode to a surface area of the second electrode is in a range from 2:3 to 1:100.

11. The catheter according to claim 8, wherein

the set of electrodes comprises at least two second electrodes configured for operation in the mode of the second polarity different than the first polarity.

12. The catheter according to claim 11, wherein

the set of electrodes comprises at least two third electrodes configured for operation in the mode of the state of high impedance.

13. The catheter according to claim 11, wherein

a ratio of a surface area or sum of the surface areas of the at least one first electrode to a sum of a surface areas of the at least two second electrodes is in a range from 2:3 to 1:100.

14. The catheter according to claim 8, wherein

the third electrode is spatially adjacent to the first electrode.

15. A catheter for pulsed field ablation of a tissue by pulsed electric field, the catheter configured for insertion into a heart of a patient;

wherein

the catheter comprising a set of electrodes couplable to a pulse generator, wherein the pulse generator is configured to generate electric pulses;

the set of electrodes configured to provide pulsed electric fields from the electric pulses causing ablation of a tissue within the heart of the patient;

wherein the set of electrodes comprises a first electrode configured for operation in a mode of a first polarity, a second electrode configured for operation in a mode of a second polarity different than the first polarity, and a third electrode configured for operation in a mode of a state of high impedance; and

wherein the set of electrodes comprises at least one electrode configured to be switched between at least two of the modes during an ablation.

16. The catheter according to claim 15, wherein

the third electrode is configured for operation in a mode of a state of impedance higher than 500 Ω.

17. The catheter according to claim 15, wherein

a ratio of a surface area of the first electrode to a surface area of the second electrode is in a range from 2:3 to 1:100.

18. The catheter according to claim 15, wherein

the set of electrodes comprises at least two second electrodes configured for operation in the mode of the second polarity different than the first polarity.

19. The catheter according to claim 18, wherein

the set of electrodes comprises at least two third electrodes configured for operation in the mode of the state of high impedance and wherein a ratio of a surface area or sum of the surface areas of the

at least one first electrode to a sum of a surface areas of the at least two second electrodes is in a range from 2:3 to 1:100.

20. The catheter according to claim 15, wherein

the third electrode is spatially adjacent to the first electrode.

21. The catheter according to claim 15, wherein

the catheter is configured to be manipulated from a collapsed configuration to at least one expanded configuration.

22. The catheter according to claim 15, wherein

the catheter comprising an expandable basket;

and wherein the set of electrodes is positioned on the basket.

23. The catheter according to claim 22, wherein

the expandable basket comprising a plurality of filaments comprising an electrically non-conductive material; and wherein the set of electrodes is positioned on the plurality of filaments.

24. An ablation device for pulsed field ablation of a tissue by pulsed electric field, the device comprising:

a pulse generator configured to generate electric pulses, the pulse generator configured to be electrically coupled to a set of electrodes configured to provide pulsed electric fields from the electric pulses, the pulsed electric fields configured to cause an ablation of a tissue within a heart of a patient;

wherein the device is configured to switch a first electrode from the set of electrodes to a mode with a first polarity, a second electrode from the set of electrodes to a mode with a second polarity different than the first polarity, and a third electrode from the set of electrodes to a mode of a state of a high impedance; and

wherein the device is configured to switch at least one electrode from the set of electrodes between at least two of the modes during an ablation.

25. The ablation device according to claim 24, wherein

an impedance in the mode of a state of a high impedance is higher than 500 Ω.

26. The ablation device according to claim 24, wherein

a ratio of a surface area of the first electrode to a surface area of the second electrode is in a range from 2:3 to 1:100.

27. The ablation device according to claim 24, wherein

the device is configured to switch at least two second electrodes from the set of electrodes to the mode of the second polarity different than the first polarity.

28. The ablation device according to claim 27, wherein

the device is configured to switch at least two third electrodes from the set of electrodes to a mode of state of a high impedance.

29. The ablation device according to claim 27, wherein

a ratio of a surface area or sum of the surface areas of the at least one first electrode to a sum of a surface areas of the at least two second electrodes is in a range from 2:3 to 1:100.

30. The ablation device according to claim 24, wherein

the third electrode is spatially adjacent to the first electrode.