CLAIMS

1. A urinary tract infection treatment apparatus comprising:

an elongate probe comprising a coaxial cable for conveying radiofrequency (RF) electromagnetic (EM) energy and/or microwave EM energy,

a probe tip connected at the distal end of the coaxial cable for receiving the RF and/or microwave EM energy, and

a gas conduit for conveying gas to the probe tip;

wherein the coaxial cable comprises an inner conductor, an outer conductor and a dielectric material separating the inner conductor from the outer conductor,

wherein the probe tip comprises a first electrode connected to the inner conductor of the coaxial cable, and a second electrode connected to the outer conductor of the coaxial cable, and

wherein the first electrode and second electrode are arranged to produce an electric field from the received RF and/or microwave EM energy across a flow path of gas received from the gas conduit to produce a non-thermal plasma; and

wherein the probe tip includes a temperature sensor arranged to detect a temperature of the plasma.

2. The apparatus of claim 1, wherein the second electrode encloses an internal volume of the probe tip, wherein the first electrode extends longitudinally within the internal volume,

wherein the probe tip further comprises an insulating cap mounted at a distal end of the coaxial cable to isolate the coaxial cable from the internal volume,

wherein the gas conduit is in fluid communication with the internal volume via a flow path formed between the insulating cap and the second electrode,

wherein the first electrode and second electrode are configured to receive the RF and/or microwave energy from the coaxial cable to set up an electric field in the internal volume for striking a plasma therein, and

wherein the probe tip includes an outlet for releasing plasma from the internal volume.

3. The apparatus of claim 1 or claim 2, wherein the elongate probe further comprises steering wires for steering the probe tip.

4. The apparatus of any preceding claim, further comprising a withdrawal device mountable on the elongate probe and configured to retract the elongate probe therethrough.

5. The apparatus of any preceding claim, further comprising a surgical scoping device for introducing the elongate probe to a urinary tract.

6. The apparatus of claim 5, wherein the surgical scoping device is a flexible scoping device.

7. The apparatus of ~~any preceding~~one of claims 2 to 6, wherein the insulating cap is mounted within the second electrode, and wherein the flow path comprises a plurality of openings in the second electrode that permit gas flow around the insulating cap.

8. The apparatus of claim 7, wherein the second electrode is a cylinder, and the plurality of openings each comprise a longitudinal notch in the cylinder.

9. The apparatus of claim ~~4~~7, wherein a proximal end of the second electrode is castellated to provide the plurality of openings.

10. The apparatus of preceding claim, wherein the elongate probe comprises a protective sleeve that defines a lumen through which the coaxial cable extends, and wherein the gas conduit is a passageway formed between an outer surface of the coaxial cable and an inner surface of the protective sleeve.

11. The apparatus of any preceding claim, wherein the probe tip comprises a conductive cap mounted on the first electrode at a distal end of the internal volume, the conductive cap being spaced from a distal end of the second electrode to define the outlet.

12. The apparatus of any preceding claim, wherein the first electrode is helical.

13. The apparatus of any preceding claim, wherein the first electrode is formed from a portion of the inner conductor of the coaxial cable that extends beyond a distal end of the outer conductor.

14. The apparatus of any preceding claim, wherein the insulating cap has a chamfered distal edge.

15. The apparatus of any preceding claim, wherein the apparatus is part of a robotically assisted surgical system.

~~16. The apparatus of any preceding claim, wherein the probe tip includes a temperature sensor arranged to detect a temperature of the plasma.~~

~~17~~16. The apparatus of ~~claim 17~~any preceding claim, further comprising a controller configured to control plasma generation parameters of the plasma based on a signal from the temperature sensor.