CLAIMS

1. An apparatus for sterilizing a surgical scoping device, the apparatus comprising:

a sterilization instrument insertable through a longitudinal channel that extends along an insertion tube of a surgical scoping device, the sterilization instrument 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 energy, and

a gas conduit for conveying gas to the probe tip;

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

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,

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,

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

wherein the insulating cap is mounted within the second electrode,

wherein the second electrode is a cylinder that sits within the annular passageway of the gas conduit at its distal end, and

wherein the second electrode is castellated to provide a plurality of longitudinal notches in the cylinder that provide the flow path to permit gas flow around the insulating cap.

2. The apparatus of claim 1 including a liquid conduit for delivering water to the internal volume.

3. The apparatus of claim 2, wherein the liquid conduit is a hollow passage through the inner conductor of the coaxial cable.

4. The apparatus of claim 2 or 3, wherein the liquid conduit is configured to deliver water mist into the internal volume.

5. 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.

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

7. 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.

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

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

10. The apparatus of claim 9, wherein the withdrawal device comprises a motor drivable to retract the elongate probe at a speed less than 10 mm per second.

11. The apparatus of any preceding claim, wherein the probe tip further comprises a cleaning brush mounted at a distal end thereof.

12. The apparatus of any preceding claim further comprising a vibration excitation device configured to impart ultrasonic vibrations to the elongate probe and/or the probe tip.

13. The apparatus of claim 12, wherein the vibration excitation device is mounted on the elongate probe.