WHAT IS CLAIMED IS:

1. A system, comprising:

a cathode comprising a cathode tube;

a thermionic emitter installed at least partially within the cathode tube; and

a graphite heater surrounding the cathode tube and configured to heat the thermionic emitter, the graphite heater being in a shape of a hollow circular cylinder, the graphite heater comprising:

a first end;

a second end opposite the first end;

a plurality of hollow ceramic insulating tubes that each run from the first end to the second end; and

a heater wire that runs through each of the hollow ceramic insulating tubes, the heater wire configured to be resistively heated by an electrical current passed through the heater wire.

2. The system of Claim 1, wherein the ceramic of the plurality of hollow ceramic insulating tubes ~~is selected from the group consisting of~~comprises:

alumina;

~~shapl;~~

halfnium oxide;

boron nitride; ~~and~~or

magnesium oxide.

3. The system of Claim 1, wherein the heater wire is formed from a refractory metal.

4. The system of Claim 3, wherein the refractory metal is selected from the group consisting of:

tantalum;

rhenium;

tungsten; and

molybdenum.

5. The system of Claim 1, wherein the graphite heater is at least partially surrounded by a reflective foil.

6. A system, comprising:

a cathode comprising a cathode tube;

a thermionic emitter installed at least partially within the cathode tube; and

a heater surrounding the cathode tube and configured to heat the thermionic emitter, the heater comprising:

a first end;

a second end opposite the first end;

a plurality of hollow insulating tubes that each run from the first end to the second end; and

a heater wire that runs through each of the hollow insulating tubes, the heater wire configured to be resistively heated by an electrical current passed through the heater wire.

7. The system of Claim 6, wherein the heater is in a shape of a hollow circular cylinder.

8. The system of Claim 6, wherein the heater is formed from:

graphite;

tungsten;

rhenium; or

molybdenum.

9. The system of Claim 6, wherein each of the plurality of hollow insulating tubes are formed from ceramic.

10. The system of Claim 9, wherein the ceramic ~~is selected from the group consisting of~~comprises:

alumina;

~~shapal;~~

halfnium oxide;

boron nitride; ~~and~~or

magnesium oxide.

11. The system of Claim 6, wherein the heater wire is formed from a refractory metal.

12. The system of Claim 11, wherein the refractory metal is selected from the group consisting of:

tantalum;

rhenium;

tungsten; and

molybdenum.

13. The system of Claim 6, wherein the heater is at least partially surrounded by a reflective foil.

14. A system, comprising:

a thermionic emitter; and

a heater at least partially surrounding the thermionic emitter, the heater configured to heat the thermionic emitter, the heater comprising:

a first end;

a second end opposite the first end;

a plurality of hollow insulating tubes that each run from the first end to the second end; and

a heater wire that runs through each of the hollow insulating tubes, the heater wire configured to be resistively heated by an electrical current passed through the heater wire.

15. The system of Claim 14, wherein the heater is in a shape of a hollow circular cylinder.

16. The system of Claim 14, wherein the heater is formed from:

graphite;

tungsten;

molybdenum; or

rhenium.

17. The system of Claim 14, wherein each of the plurality of hollow insulating tubes are formed from ceramic.

18. The system of Claim 17, wherein the ceramic ~~is selected from the group consisting of~~comprises:

alumina;

~~shapal;~~

halfnium oxide;

boron nitride; ~~and~~or

magnesium oxide.

19. The system of Claim 14, wherein the heater wire is formed from a refractory metal, the refractory metal being selected from the group consisting of:

tantalum;

rhenium;

tungsten; and

molybdenum.

20. The system of Claim 14, wherein the heater is at least partially surrounded by a reflective foil.