CLAIMS

What is claimed is:

1. An electronic ballast circuit for limiting lamp strike voltage, comprising:

a ballast driver circuit (140) comprising:

a resonant circuit (620) having a first resonant frequency and configured to drive a lamp (602); and

a voltage limiter circuit (610) connected to said resonant circuit (620~~).~~);

wherein: the resonant circuit (620) comprises a first inductor (622), a run capacitor (624) and a strike capacitor (626) connected together in series, with the lamp (602) connected across the strike capacitor (626); and the voltage limiter circuit (610) is connected across the run capacitor (624).

2. The electronic ballast circuit for limiting lamp strike voltage according to claim 1, wherein

said first resonant frequency changes to a second resonant frequency when a lamp voltage exceeds a threshold voltage, whereby said lamp voltage is clamped to said threshold voltage.

3. The electronic ballast circuit according to claim 1~~, wherein: the resonant circuit (620) comprises a first inductor (622) connected in series with a run capacitor (624) and a strike capacitor (626), with the lamp (602) connected across the strike capacitor (626); and the voltage limiter circuit (610) is connected across the run capacitor (624).~~

~~4. The electronic ballast circuit according to claim 3~~, wherein the voltage limiter circuit (610) comprises:

a first varistor (612a), a strike voltage charge high side capacitor (614a) and a first diode (616a) connected in series between a high side of the run capacitor (624) and a common voltage (Cbus);

a second varistor (612b), a strike voltage charge low side capacitor (614b) and a second diode (616b) connected in series between a low side of the run capacitor (624) and said common voltage (Cbus);

wherein the first diode (616a) is arranged to conduct in a first direction and the second diode (616b) is arranged to conduct in a direction opposite to the first direction.

~~5~~4. The electronic ballast circuit according to claim ~~4~~3, wherein the voltage limiter circuit (610) further comprises:

a third varistor (618) bridging a first point located between the strike voltage charge high side capacitor (614a) and the first diode (616a) and a second point located between the strike voltage charge low side capacitor (614b) and the second diode (616b).

~~6~~5. The electronic ballast circuit according to claim ~~4~~3, wherein:

the common voltage (Cbus) is derived from a voltage divider formed by first and second capacitors (128a, 128b) connected across a pair of bus lines (132a, 132b).

~~7~~6. The electronic ballast circuit according to claim ~~4~~3, wherein:

the ballast driver circuit (140) devoid of a resistor configured for detecting current conditions therein to mitigate power consumption and generation of heat.

~~8. An~~7. The electronic ballast circuit according to claim 1, further comprising:

a ballast controller circuit configured to output at least one drive signal to said ballast driver circuit;

a power factor correction circuit outputting a current sense signal reflective of a voltage;

a control and amplifier circuit configured to receive said current sense signal, provide a power correction feedback signal to the power factor correction circuit, and provide one or more output signals to control the ballast controller circuit;

~~a ballast driver circuit configured to receive said at least one drive signal from the ballast controller circuit, the ballast driver circuit comprising: a resonant circuit that connectable to a lamp; and a voltage limiter circuit configured to regulate behavior of the resonant circuit;~~ and

an overcurrent sensor circuit configured to output a signal to the control and amplifier circuit to thereby indirectly control the ballast controller circuit via the control and amplifier circuit.

~~9. An~~8. The electronic ballast circuit ~~for limiting lamp strike voltage,~~according to claim 1, further comprising:

a power supply circuit (110);

a power factor controller circuit (120) connected to said power supply (~~1 10~~110), said power factor controller circuit (120) comprising a PFC integrated chip (210) and a voltage divider.

~~10~~9. The electronic ballast circuit for limiting lamp strike voltage according to claim ~~9~~8, wherein said voltage divider comprises a first bus divider resistor (124) and a second bus divider resistor (126).

~~1 1~~10. The electronic ballast circuit for limiting lamp strike voltage according to claim ~~10~~9, further comprising a node disposed between said first bus divider resistor (124) and said second bus divider resistor (126).

~~12~~11. The electronic ballast circuit for limiting lamp strike voltage according to claim ~~1 1~~10, wherein said first bus divider resistor (124) is disposed between a first main bus (+Main bus 132a) and said node.

~~13~~12. The electronic ballast circuit for limiting lamp strike voltage according to claim ~~1 1~~10, wherein said second bus divider resistor (124) is disposed between a second main bus (-Main bus 132b) and said node.

~~14. An~~13. The electronic ballast circuit ~~for limiting lamp strike voltage,~~according to claim 1, further comprising:

a run comparator (310);

a strike oscillator (340) connected to said run comparator (310); and

ballast enable logic circuitry (360) connected to said run comparator (310) and said strike oscillator (340).

~~15~~14. The electronic ballast circuit for limiting lamp strike voltage of claim ~~14~~13, further comprising a dimmer delay timer circuitry (350) connected to said run comparator (310).

~~16~~15. The electronic ballast circuit for limiting lamp strike voltage of claim ~~14~~13, further comprising:

a power limit characterization (PLC) circuitry (317), said PLC circuitry (317) comprising: a PLC first amplifier 320, a PLC first amplifier integrator 322, a PLC second amplifier 330, and a PLC second amplifier limiter 332.

~~17. An~~16. The electronic ballast circuit ~~for limiting lamp strike voltage,~~according to claim 1, further comprising:

a dimmer converter voltage regulator (420);

a voltage-to-duty-cycle converter (410) connected to said dimmer converter voltage regulator (420);

a first opto-isolator (440) connected to said voltage-to-duty-cycle converter (410); and

a second opto-isolator (450) connected to said voltage-to-duty-cycle converter (410).

~~18~~17. The electronic ballast circuit for limiting lamp strike voltage according to claim ~~17~~16, further comprising a dimmer shunt resistor (184) disposed between said dimmer converter voltage regulator (420) and said voltage-to-duty-cycle converter (410).

~~19~~18. The electronic ballast circuit for limiting lamp strike voltage according to claim ~~17~~16, wherein said first opto-isolator (440) and said second opto-isolator (450) are connected in series.

~~20~~19. The electronic ballast circuit for limiting lamp strike voltage according to claim ~~19~~18, wherein a cathode of said first opto-isolator (440) is connected to an anode of said second opto-isolator (450).

~~21~~20. The electronic ballast circuit for limiting lamp strike voltage according to claim ~~17~~16, further comprising:

an opto-isolator enable inverter circuit (460) comprising a first enabling transistor (Q105) and a second enabling transistor (Q106),

wherein said first enabling transistor (Q105) is connected to said first opto-isolator (440) and said second enabling transistor (~~Q 106~~Q106) is connected to said second opto-isolator (450).

~~22~~21. The electronic ballast circuit for limiting lamp strike voltage according to claim ~~21~~20, further comprising:

a dimmer frequency adjust level limiter (470) disposed between said first opto-isolator (440) and a dimmer frequency adjust integrator (472); and

a dimmer bus correction level limiter (480) disposed between said second opto-isolator (440) and a dimmer bus correction integrator (482).

22. The~~23. An~~ electronic ballast circuit ~~for limiting lamp strike voltage,~~according to claim 1, further comprising:

an overcurrent sensor circuit (160);

a ballast controller integrated circuit (IC) (520) connected to said overcurrent sensor circuit (160); and

a ballast driver circuit (140) connected to said ballast controller IC (520).

23. The electronic ballast circuit for limiting lamp strike voltage according to claim 22, wherein said overcurrent sensor circuit (160) comprises an overcurrent sense transistor (Q110) connected to an integration circuit.

24. The electronic ballast circuit for limiting lamp strike voltage according to claim 23, wherein said ~~overcurrent sensor circuit (160) comprises an overcurrent sense transistor (QUO) connected to an integration circuit.~~

~~25. The electronic ballast circuit for limiting lamp strike voltage according to claim 24, wherein said~~ integration circuit comprises a sense integrator resistor (535) connected in series with a sense integrator capacitor (C129).

~~26~~25. The electronic ballast circuit for limiting lamp strike voltage according to claim ~~23~~22, further comprising: a sense diode (532) connected in series with sense resistor (534).

~~27~~26. The ballast circuit for limiting lamp strike voltage according to claim ~~23~~22, wherein said ballast controller IC (520) further comprises:

a plurality of parameter pins (~~51 1~~511) connected to ballast controller setup sweep TC capacitor (512), a ballast controller setup sweep TC resistor 514, a ballast controller setup run frequency capacitor (516), and a ballast controller setup run frequency resistor (518).

~~28~~27. The ballast circuit for limiting lamp strike voltage according to claim ~~23~~22, wherein said ballast controller IC (520) further comprises: a ballast controller switching transistor (Q103) comprising an emitter lead (546), wherein said ballast controller switching transistor (Q103) is connected to a collector resistor (R109), a ballast controller Vcc switch divider resistor (545), and a ballast controller Vcc switch divider resistor (548).