CLAIMS

1. An optical device to be applied to electro-luminescent lamps, include at least, fluorescent lamps and white light emitting diodes (LED) , the optical device is external to a source for generating light, and is composed of an optical reflector and a multilayer optical filter where;

the optical reflector is a specular or diffuse metallic surface, with a reflectance of not less than 98%, which reflects the light generated by the source towards a work plane;

the multilayer optical filter is a transparent and rigid multilayer structure, which is made of a transparent, organic or inorganic material that serves as substrate (9) on which a layer of zinc oxide is applied, the layer of zinc oxide being the active layer of the multilayer optical filter , the layer of zinc oxide has a thickness of 1.5 to 3 micrometers, containing in its interior, a nanostructure of zinc oxide nano wires (NEH) with a lattice constant from 200 nm to 400 nm, filing ratio from 0.5 to 0.8 and height from 1 to 2 micrometers, said multilayer optical filter behaves as a partial light reflector in the bandwidth from 380 nm to 530 nm and as an antireflective element in the range of 531 nm to 1100 nm and;

the index of refraction of the substrate is greater than that of the layer of zinc oxide to cause destructive interference of the reflected light, since their waves are displaced in phase 180 °.

2. The optical device according to claim 1, wherein the multilayer optical filter completely covers an emission angle of an luminescent layer of the source without being in contact with the luminescent layer of the source.

3. The optical device according to claim 1, wherein the inorganic material is made of lime or borosilicate glass with a thickness of 0.1 mm to 1.0 mm.

4. The optical device according to claim 1, wherein the organic material is made of a thermoplastic resin either of methyl-methacrylate or a polycarbonate with a thickness of 0.1 mm to 1.0 mm.

5. The optical device according to claim 1, wherein the nanostructure of zinc oxide nano wires (NEH) allow the partial passage of light in the range of 380 nm to 530 nm so as not to decrease the color rendering index IRC of the source.

6. The optical device according to claim 1, wherein the optical reflector has a parabolic shape when applied to a linear fluorescent lamp.

7. The optical device according to claim 6, wherein an inner surface of the linear fluorescent lamp is covered by an electro-luminescent material .

8. The optical device according to claim 1, wherein the multilayer optical filter has a cylindrical shape, when applied to a linear fluorescent lamp.

9. The optical device according to claim 1, wherein an inner diameter of the multilayer optical filter is greater than an outer diameter of the fluorescent lamp by at least 2 mm, and its length encompasses entire luminescent surface of the fluorescent lamp.

10. The optical device according to claim 1, wherein a linear fluorescent lamp is housed within the multilayer optical filter coaxially.

11. The optical device according to claim 10, wherein the multilayer optical filter and the linear fluorescent lamp are mechanically attached to the optical reflector by means of two bases , each of the bases positioned at an end of the linear fluorescent lamp, and the bases serve as a means of supplying electric power to said lamp.

12. The optical device according to claim 1, wherein the optical reflector is flat when the source includes LED lamps linear module for general use in illumination.

13. The optical device according to claim 12, wherein a white light LED linear module is mounted on the optical reflector by means of screws or any other similar means, and is placed symmetrically.

14. The optical device according to claim 13, wherein the optical reflector is 50% wider than the white light LED lamps linear module .

15. The optical device according to claim 13, wherein the white light LED lamps linear module is a printed circuit on which at least one or several semiconductor light emitting diodes are mounted, and the semiconductor light emitting diodes emit short wavelength light over a luminescent layer that emits white light when said short wavelength light is applied.

16. The optical device according to claim 13, wherein the multilayer optical filter has a semicircular shape with a diameter of twice the width of the white light LED lamps linear module , and has two horizontal side wings arranged at the ends of the semicircle of at least 2 mm wide forming a single piece in the shape of an omega.

17. The optical device according to claim 13, wherein the multilayer optical filter is mounted on the optical reflector by means of screws or other means, the white light LED linear module contains semiconductor diodes or emitters of white light disposed inside a cavity that is formed in between the multilayer optical filter and the optical reflector, wherein the multilayer optical filter is mounted on the optical reflector in such a manner that the active layer of the multilayer optical filter facing a luminescent layer of semiconductor diodes or white LEDs.

18. The optical device according to claim 1, wherein a white light LED linear module is disposed outside a geometric focus of a semicircular optical filter.

19. The optical device according to claim 1, wherein the multilayer optical filter has a reflectance of 60% to 90% in a wavelength range from 380 nm to 490 nm.

20. The optical device according to claim 1, wherein the multilayer optical filter has a reflectance of 30% to 60% in a wavelength range from 491 nm to 500 nm.

21. The optical device according to claim 1, wherein the multilayer optical filter has a reflectance of 10% to 30% in a wavelength range from 501 nm to 530 nm.

22. The optical device according to claim 1, wherein the multilayer optical filter has a reflectance of 0% to 10% in a wavelength range from 531 nm to 1100 nm.

23. The optical device according to claim 1, wherein the multilayer optical filter has an absorbance of 60% to 90% in a wavelength range from 380 nm to 490 nm.

24. The optical device according to claim 1, wherein the multilayer optical filter has an absorbance of 30% to 60% in a wavelength range from 491 nm to 500 nm.

25. The optical device according to claim 1, wherein the multilayer optical filter has an absorbance of 10% to 30% in a wavelength range from 501 nm to 530 nm.

26. The optical device according to claim 1, wherein the multilayer optical filter has an absorbance of 0% to 10% in a wavelength range from 531 nm to 1100 nm