CLAIMS

1. A three-dimensional distributed liquid atomization heat exchanger, comprising a shell, an air extraction device, a heat exchange device and a liquid atomization device, wherein the air extraction device is arranged outside the shell and configured to form negative pressure in the shell; the heat exchange device and the liquid atomization device are arranged in the shell; the liquid atomization device comprises a liquid supply pipe, a plurality of atomization exhaust pipes and a plurality of atomization heads, the plurality of atomization exhaust pipes is connected with the liquid supply pipe, and the plurality of atomization heads is arranged on the plurality of atomization exhaust pipes, the atomization exhaust pipe is arranged in the shell in a three-dimensional distributed manner, characterized in that the three-dimensional liquid atomization heat exchanger is provided with a control center and in that the plurality of atomization heads is provided with a control device to control opening or closing of the plurality of atomization heads, and the control device is connected to the control center, wherein the control center is configured to randomly select the atomization heads to be opened or closed according to the set time, the set open percentage of the atomization heads, and the random function, the opening or closing of each atomization head is random to allow the atomized liquid in the shell to be evenly distributed; said control center is an intelligent computer.

2. The three-dimensional distributed liquid atomization heat exchanger according to claim 1 , wherein the heat exchange device is arranged around each atomization head, and the heat exchange device is configured to circulate refrigerant, the atomization head is configured to spray atomized liquid, and the atomized liquid diffuses around the heat exchange device, under the action of negative pressure, liquid micelles and carbon dioxide in the heat exchange device complete the radiation heat transfer and are extracted from the shell by the air extraction device.

3. The three-dimensional distributed liquid atomization heat exchanger according to claim 2, configured such that, during refrigeration, water micelles in the cavity absorb radiant heat of carbon dioxide circulating in the heat exchange device, and then water micelles

are dynamically and continuously decomposed into small micelles, so as to take away the heat and condense and liquefy the carbon dioxide refrigerant.

4. The three-dimensional distributed liquid atomization heat exchanger according to claim 1, wherein the plurality of atomization exhaust pipes is arranged in a matrix form in layers, and at least two atomization heads are arranged on each atomization exhaust pipe.

5. The three-dimensional distributed liquid atomization heat exchanger according to claim 1, wherein the heat exchange device comprises a plurality of heat exchange units and is formed by stacking the plurality of heat exchange units, the heat exchange unit comprises a plurality of rows of pipes for circulating carbon dioxide and fins for fixing the rows of pipes, and a fixing frame, the plurality of rows of pipes and fins are fixed by the fixing frame, and configured such that carbon dioxide flows in from an inlet end and is discharged from an outlet end; an atomization exhaust pipe is arranged in the heat exchange unit.

6. The three-dimensional distributed liquid atomization heat exchanger according to claim 5, wherein the plurality of rows of pipes of a plurality of heat exchange units is stacked and connected in series, the heat exchange unit is fixed on the shell, and the atomization exhaust pipes are respectively connected to the liquid supply pipes.

7. The three-dimensional distributed liquid atomization heat exchanger according to claim 1, further comprising a control device arranged on each atomization exhaust pipe for controlling the opening or closing of the atomization exhaust pipe, said control device is connected to the control center.

8. The three-dimensional distributed liquid atomization heat exchanger according to claim 1, wherein the atomization head is an ultrasonic atomizer, which comprises an ultrasonic atomization sheet, and the ultrasonic atomization sheet and ultrasonic waves is configured to atomize water;

wherein the three-dimensional liquid atomization heat exchanger is configured such that water vapor after heat exchange is not recycled, and is discharged directly into the atmosphere.

9. The three-dimensional distributed liquid atomization heat exchanger according to claim 1, wherein the air extraction device is a negative pressure fan, a magnetic suspension negative pressure fan or a vacuum air extraction pump.

10. The three-dimensional distributed liquid atomization heat exchanger according to claim 1, wherein the shell is a closed shell, and the air extraction device is configured to form a set negative pressure value in the closed shell to realize efficient heat exchange; wherein an exhaust amount of the air extraction device is greater than an evaporation amount of atomized liquid in the shell, on one hand, vapor in the shell is fully discharged, so as to improve the evaporation efficiency of the atomized liquid, and on the other hand, the negative-pressure environment in the shell is maintained.

11. The three-dimensional distributed liquid atomization heat exchanger according to claim 1, wherein the heat exchanger comprises a pressure regulating device, an air inlet of the pressure regulating device is arranged outside the shell, and an air outlet of the pressure regulating device is arranged inside the shell, the regulated air flow is allow to be sent into the shell through the pressure regulating device to promote the flow of vapor in the shell and form aerosol in the shell.

12. The three-dimensional distributed liquid atomization heat exchanger according to claim 1, wherein the liquid supply pipe is configured to communicate with a liquid tank outside the shell and configured to continuously supply liquid into the shell; wherein the liquid is softened water, which removes inorganic salts such as calcium and magnesium, reduces entry of external impurities, avoids scaling of condenser pipes to the greatest extent, and prolongs a service life of heat exchange pipes.

13. A control method of a three-dimensional distributed liquid atomization heat exchanger, wherein an atomization head is arranged in a shell of the heat exchanger in a three-dimensional distribution manner, a control center codes a control device on the atomization head, when the heat exchanger does not need to operate at full load, an open percentage of the atomization head is input, the control center selects the atomization head that needs to be opened or closed according to a random function every set time,

the opening or closing of the atomization head is random to achieve uniform atomization liquid in the shell.

14. A refrigeration system, comprising a compressor, a heat exchanger, a liquid reservoir and an evaporator connected in sequence, wherein the heat exchanger is a three-dimensional distributed liquid atomization heat exchanger according to any one of claims 1 to 12.

15. A carbon dioxide multi-split central air conditioner, comprising an indoor heat exchanger and an outdoor unit, wherein the outdoor unit is connected with the indoor heat exchanger through a pipeline, the outdoor unit comprises a carbon dioxide compressor, a liquid reservoir and a heat exchanger, the central air conditioner is configured to use carbon dioxide as a single cycle working medium, wherein the heat exchanger is a three-dimensional distributed liquid atomization heat exchanger according to any one of claims 1 to 12.