CLAIMS

1. An air ionization display device, comprising:

a pulse-light-source module configured to generate a plurality of synchronous pulse light beams, the pulse-light-source module comprising a plurality of pulse light sources configured to generate the plurality of pulse light beams respectively, wherein a pulse energy of each of the plurality of pulse light sources is less than an air ionization threshold and a sum of the pulse energy of each of the plurality of pulse light sources is greater than the air ionization threshold;

a light field control module, the plurality of pulse light beams being projected to the light field control module and the light field control module being configured to adjust and converge the plurality of pulse light beams and ionize air in a display area to form a holographic real image; and

a pulse-repetition-frequency adjustment component, arranged between the plurality of pulse light sources and the display area and configured to adjust pulse repetition frequencies of the plurality of pulse light sources,

wherein the pulse-repetition-frequency adjustment component comprises:

a plurality of photodetectors, arranged one by one between the plurality of pulse light sources and the display area and configured to detect the pulse repetition frequencies of the plurality of pulse light sources;

a second frequency reference source configured to provide a frequency reference standard; and

a second servo controller, signally coupled to the plurality of photodetectors, the second frequency reference source and the plurality of pulse light sources and configured to control the pulse repetition frequencies of the plurality of pulse light sources based on feedback information of the plurality of photodetectors and feedback information of the second frequency reference source.

2. The device as claimed in claim 1, wherein the pulse-light-source module comprises:

a first beam combiner, the plurality of pulse light beams generated by the plurality of pulse light sources being projected on the first beam combiner to combined into one light beam and the combined light beam being projected to the light field control module.

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3. The device as claimed in claim 2, further comprising:

a first pulse delay monitor, arranged between the first beam combiner and the light field control module and configured to monitor a pulse delay signal of the beam emitted by the first beam combiner; and

at least one first delay line, arranged between the plurality of pulse light sources and the first beam combiner, signally coupled to the first pulse delay monitor and configured to compensate pulse delays of beams output from the plurality of pulse light sources based on feedback information of the first pulse delay monitor.

4. The device as claimed in claim 3, wherein a number of the at least one first delay line is one less than a number of the plurality of pulse light sources and the at least one first delay line is corresponding to the same number of pulse light sources one by one.

5. The device as claimed in claim 4, wherein a second beam splitter is provided between the first beam combiner and the light field control module and configured to reflect partial light beam emitted by the first beam combiner to the first pulse delay monitor.

6. The device as claimed in any one of claims 2 to 5, wherein there are a plurality of first beam combiners, a number of the plurality of first beam combiners is one less than a number of the plurality of pulse light sources, the plurality of first beam combiners are arranged at intervals along a light beam emitted by one of the plurality of pulse light sources, light beams emitted by remaining pulse light sources are projected on the plurality of first beam combiners one by one, and light beams emitted by the plurality of pulse light sources are combined into one light beam.

7. The device as claimed in any one of claims 2 to 5, further comprising:

a plurality of first reflecting mirrors, arranged between the plurality of pulse light sources and the first beam combiner and configured to reflect light beams transmitted by the plurality of pulse light sources to the first beam combiner.

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