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**United States Patent**

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(12) **United States Patent**  
**Yu**

(10) **Patent No.:** **US 9,921,197 B2**  
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(54) **BOTH ULTRAVIOLET-VISIBLE AND DOUBLE MONOCHROMATIC FLUORESCENCE DUAL DETECTOR FOR HIGH PERFORMANCE LIQUID CHROMATOGRAPHY**

G01N 30/74; G01N 21/645; G01N 21/33; G01N 2201/068; G01N 2030/027; G01N 2021/6417; G01N 2201/124; G01N 2201/1241; G01N 2030/621

See application file for complete search history.

(71) Applicant: **Jiade Yu**, Shanghai (CN)

(56) **References Cited**

(72) Inventor: **Jiade Yu**, Shanghai (CN)

U.S. PATENT DOCUMENTS

(\* ) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 100 days.

3,972,627 A \* 8/1976 Rabl ..... G01N 21/272  
250/428  
6,115,119 A \* 9/2000 Sieracki ..... G01N 15/0227  
356/337

(Continued)

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*Primary Examiner* — Que T Le

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*Assistant Examiner* — Jennifer Bennett

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(74) *Attorney, Agent, or Firm* — Global IP Services; Tianhua Gu

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(57) **ABSTRACT**

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A both ultraviolet-visible and double monochromatic fluorescence dual detector has a small inner-casing, which combines both ultraviolet-visible and double monochromatic fluorescence dual detector widely used in the high performance liquid chromatography by taking the first to use deuterium lamp as the individual light source of the dual detectors, the individual sample detection cell and the individual electrical circuit, the device comprises a detection optical member, which including a first monochromatic spectroscopic device—raster G1, a second monochromatic spectroscopic device—raster G2, a light source, four groups of lens needed for processing the light paths; and a detection electromechanical member, which includes: a central controller, a proposed amplifying module, an auto gain module, a noise processing module and a logarithm amplifying module. The dual detector realizes the sensitivity and stability, also the elimination of noise and drift.

(52) **U.S. Cl.**

CPC ..... **G01N 30/78** (2013.01); **G01N 21/33** (2013.01); **G01N 21/645** (2013.01); **G01N 30/74** (2013.01); **G01N 2021/6417** (2013.01); **G01N 2030/027** (2013.01); **G01N 2201/068** (2013.01); **G01N 2201/124** (2013.01)

(58) **Field of Classification Search**

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