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**Belenky et al.**

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(54) **SEMICONDUCTOR LIGHT SOURCE WITH ELECTRICALLY TUNABLE EMISSION WAVELENGTH**

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(57) **ABSTRACT**

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**H01S 5/00** (2006.01)

(52) **U.S. Cl.** ..... 372/20; 372/44.01

(58) **Field of Classification Search** ..... None  
See application file for complete search history.

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A semiconductor light source comprises a substrate, lower and upper claddings, a waveguide region with imbedded active area, and electrical contacts to provide voltage necessary for the wavelength tuning. The active region includes single or several heterojunction periods sandwiched between charge accumulation layers. Each of the active region periods comprises higher and lower affinity semiconductor layers with type-II band alignment. The charge carrier accumulation in the charge accumulation layers results in electric field build-up and leads to the formation of generally triangular electron and hole potential wells in the higher and lower affinity layers. Nonequilibrium carriers can be created in the active region by means of electrical injection or optical pumping. The ground state energy in the triangular wells and the radiation wavelength can be tuned by changing the voltage drop across the active region.

**13 Claims, 17 Drawing Sheets**

