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光电工程

# 基于单片机的LD控制系统的设计

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摘要 为了实现激光器稳定、可靠和准确的功率输出，
介绍一种基于单片机实现半导体激光器功率高稳定的控制系统。该系统以MSP430单片机为核心，
根据半导体激光器的工作原理，设计了受控恒流源、温度控制系统和光功率反馈系统等部分。此外，
系统还具有激光功率的实时控制、显示和设置以及软开关和软保护等功能。功率稳定采用光功率反馈法，
温度控制采用高精度PWM驱动的半导体制冷器。光功率稳定度优于0.25%。

关键词 半导体激光器 单片机 驱动电源 PWM驱动
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# Stable control system based on MCU for diode laser

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**Abstract** A high-stable control system based on the MCU of MSP430 for semiconductor laser is introduced to realize stable, reliable and accurate power output. According to the working principle of semiconductor laser, the controlled constant current source, temperature control system, light power feedback system and protection circuit was designed. It has real-time control, display and reset functions, and provides protection to the laser power. The light power feedback was used to achieve the light power stability. The thermoelectric cooler driven by high-accurate PWM amplifier was employed to control temperature. The light power stability is better than 0.25%.

**Key words** laser diode microprocessor driving power supply PWM driver

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