

光纤技术

一种大动态范围的磁光电流传感器方案

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摘要

提出了一种扩大磁光式电流传感器动态范围的方法。磁光式电流传感器是基于法拉第效应和安培环路定律实现电流测量的。由于法拉第旋转角随被测电流周期性增大, 测量时只能利用正弦曲线单调变化的部分, 因此限制了电流的测量范围。利用光纤维尔德常数随光波长变化这一特性, 通过测量两种光波旋转的角度差, 获得了大电流的测量值。在正常计量范围内利用单波长数据获得精度较高的计量值, 达到扩大传感器测量范围的目的。分析表明, 当两波长的维尔德常数相差20%时, 电流测量范围可以扩大到单波长时的6倍。采用这种方法可望用一个传感器同时满足电力系统中的计量和保护两种用途。

关键词 [电流传感器](#) [光纤传感器](#) [法拉第效应](#)

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A Scenario of the Magneto-Optical Current Sensor for Large Dynamic Range Measurement

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Abstract A new method to extend the dynamic range of the magneto-optical current sensor is presented.The magneto-optical current sensor is based on Farada effect and Ampere's law to realize the current measurement.Because the Faraday rotation angle increases periodically with the current measured,only a monotone region of the sinusoid could be used and the measurement range is narrowed.With the wavelength dependence of the Verdet constant,a large current could be measured by wayof measuring the difference of the rotation angles corresponding to the two different wavelengths within one sensor.The metering data,which is more accurate than the data from the dual wavelength.can be acquired by a single wavelength.It is theoretically shown that 20% Verdet constant difference between the two wavelengths will increase the current measuring range 6 times.This method can make the magneto-optical current sensor adaptive to both metering and protection in power system.

Key words [current sensor](#) [fiber sensor](#) [Faraday effect](#)

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