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ABSTRACT

The present invention discloses a distributed optical fiber identification system and method for seepage conditions of a hydraulic structure and a base thereof. The system comprises a single-mode optical fiber having an automatic control heat source specifically produced for seepage measurement, an optical path coupler and a synchronous controller, the synchronous controller is connected to a mode locked laser, a polarization beam splitter, an isolator, a grating pair, a diffraction grating, a reflector, a beam splitter, a nonlinear crystal, a spectrometer and a Michelson interferometer, the output end of the Michelson interferometer is connected to the optical path coupler, the output end of the optical path coupler is connected to a detector and a second optical splitter respectively, the detector is connected to a digital signal processor, the second optical splitter is connected to the digital signal processor through an amplifying circuit, and the digital signal processor is connected to the synchronous controller and a collector respectively. The system and the method have the advantages of high precision, high spatial resolution, high sensing speed, long distance monitoring, and can realize the flowing and automation of seepage monitoring and condition identification of a hydraulic structure and a base thereof in a harsh environment.

Fig. 1