



Contribution ID: 279

Type: **Oral (Non-Student) / orale (non-étudiant)**

## **Single mode fibre transmission apparatus, measuring light where it counts**

*Tuesday 17 June 2014 14:15 (15 minutes)*

Measuring fine loss in transmission of single mode fiber when coupled with 405nm laser light requires a sensitive apparatus as closed loop feedback systems are not commercially available. A stable laser and detector system are described which measure changes in transmission to within 0.02% change per hour over a 17-hour period. This measurement apparatus has proved useful in both pre-screening fibre systems for manufacturing, but also for determining the root cause of failure in the fibre. The transmission loss may be monitored with the detector positioned directly at the fibre, or at the focus of a relay optic placed after the fibre. Alternatively, the beam at the focus of the relay optic may be profiled on a CCD camera over time. The various measurement techniques are presented, and their use in determining the root cause of failure in transmission of the fiber. Some of various causes of failure include solarization of the fibre, contamination of the endface of the fibre, laser-induced periodic surface structure (LIPSS). Directly measuring for these requires destructive tests using for example atomic force microscopy or electron microscopy, whereas our measurement apparatus potentially provides for an indirect non-destructive means of determining the root cause of failure.

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**Session Classification:** (T2-5) Biophotonics I - DAMOPC-DIAP / Biophotonique I - DPAMPC-DPIA

**Track Classification:** Industrial and Applied Physics / Physique industrielle et appliquée (DIAP-DPIA)