Nonlinear Thermal Sensitivity of a Long-Period Grating

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***Abstract* — This work shows the thermal sensitivity of a long period grating immersed in six different external media, with refractive indices ranging from 1.0000 to 1.4315, corresponding to air, water, ethanol, thinner, turpentine and kerosene. Changes of thermal sensitivity from negative to positive values were quantified, with behaviors transitioning from linear to non-linear, depending on the refractive index of surroundings. Values for grating refractive index sensitivity and coupling thermo-optic coefficient are also determined.**

***Index Terms* — Fiber gratings, fiber sensors, long period gratings, non-linear thermal sensitivity.**