

## ACOUSTICS2008/2520 Time-Resolved Spectroscopy of Water confined in Vycor

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We present measurements on water confined in Vycor 7930 by heterodyne-detected transient grating experiments (HD-TG) [1]. We studied the acoustic wave propagation, the thermal diffusion and the liquid viscous flow through the pores as a function of temperature (-15 - 90 °C) and of the exchanged q-vector ( $0.63 - 2.5 \mu\text{m}^{-1}$ ). The data show interesting aspects due partly to the confinement effects and partly to the peculiarities of bulk water. Acoustic results are compared with the predictions of the Biot theory finding a good agreement only for the sound velocity data, while the predictions for the acoustic wave attenuation is poor as just reported in [2]. Our technique is able to induce a thermal grating inside the sample. The analysis of the data requires an extension of the Biot theory, that takes into account the temperature variations. Surprisingly, our data show that the acoustic oscillation are not affected by the temperature. The induced thermal grating is also used to analyze the viscous flow of water inside the pores and the thermal diffusion.

[1] Time-resolved spectroscopy of complex liquids, edited by Torre R. (Springer, New York) 2008 [2] A. Taschin, R. Cucini, P. Bartolini, R. Torre, Europhys. Lett., in press.