

DYNAMICS IN SUPERCOOLED WATER

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Water has more than forty anomalies, including the well known density maximum at 4C. The anomalies are more striking at very low temperature in the supercooled liquid phase. One possible explanation of these anomalies is the occurrence of a liquid-liquid phase transition, ending in a critical point, in the deep supercooled region [1]. Numerical evidences are now corroborated by new experimental results. Here I will discuss in a critical way recent experiments showing a dynamic crossover from fragile (non-Arrhenious) to strong (Arrhenious) relaxation and the numerical results showing that this crossover occurs in correspondence to the Widom line, i.e. the locus of specific heat maxima, emanating from the supercooled liquid-liquid critical point. I will present recent simulations results [2] showing how this locus is related to the relaxation of the hydrogen bonds network formed by water molecules.

[1] G. Franzese, M. Marqués, H. E. Stanley, Phys. Rev. **E67**, 011103 (2003).

[2] P. Kumar, G. Franzese, H. E. Stanley, in preparation.