



**11<sup>th</sup> May 2012 - 13:15**  
FLASH HALL, Seminar Room (28c)

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## X-rays shine light on the water mystery

Water is the key compound for our existence on this planet and it is involved in many important physical, chemical, biological and geological processes. Although water is the most common molecular substance it is also most unusual with many anomalies in its thermodynamic properties such as compressibility, density variation and heat capacity. The deviation of these properties are strongly enhanced upon supercooling water below the freezing point. The question of the structure of the hydrogen bonding network in water has been discussed intensively for over 100 years and has not yet been resolved.

This talk will describe recent X-ray spectroscopy and scattering measurements, using both synchrotron radiation at SSRL/Spring 8 and the X-ray laser at LCLS, at temperatures from deep supercooling to boiling. The results shows that the liquid can be described as fluctuations between two types of local hydrogen bonded structures driven by incommensurate requirements for minimizing enthalpy and maximizing entropy. The connection of these results to low and high density water and the 2<sup>nd</sup> critical point model will be discussed.

Host: Martina Dell'Angela & Wilfried Wurth, UHH-ASG