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Title: The emerging role of nuclear spin in the physics and chemistry of water.

It has long been known that water normally exists as a 3:1 mixture of two spin isomeric states. Until recently the assumption has been that the spin state has no significant effect on the interactions between water molecules, and also the interactions between water molecules and other substances. However, recent evidence, including information presented at previous water conferences, suggest that in some cases there can be difference in the way that the two spin isomers interact with their local environment. I will be looking at ways in which the differences in the properties of the two spin isomers might explain some of the results that have been obtained.

I will then explore how this model might be applied to some other situations where the characteristics of water are still not fully understood. For example, combining this model with a consideration of the thermally excited movement of water molecules near a surface provides a potential explanation of the anomalous characteristics of water that can occur up to a distance of hundreds of micrometers away from charged surfaces. Many of these characteristics have been presented at previous water conferences. This model may provide an explanation for the absorption of 270nm radiation that is seen in such regions, and the variation of physical characteristics with a periodicity of approximately 10 micrometers that are frequently observed near to such surfaces. Such a model may also provide a basis for the structure of water within a water gel.