

DARK WATER - IMPLICATIONS OF RECENT COLLISIONAL COOLING MEASUREMENTS

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We have continued efforts to elucidate the water-hydrogen collisional pair under interstellar conditions. The classical pressure-broadening picture, wherein the broadening parameter increases exponentially with decreasing temperature, fails for all measured transitions below approximately 80 K. Instead, dramatic decreases in the pressure broadening are observed. This situation is at odds with calculated collisional cross-sections, which indicate a strong collisional interaction at these temperatures. We will discuss the implications of these measurements in the interstellar environment in relation to SWAS, Odin and Herschel HIFI data, including its effects on the radiative rate of water, the cooling capacity of water in collapsing clouds and the effect on the elemental oxygen abundance.