

Using structured light to explore and exploit the quantum



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Abstract: I will present results on the interaction of single trapped ions with structure light beams and discuss future applications to metrology and quantum thermodynamics. Structure light can be used to tailor its action on atoms. For example, we determined it can be used to change the transition selection rules involving transfer of angular momentum. Also, more recently we have used structured beams to resolve the spatial extent of the wave-packet of an harmonic oscillator. This technique can be used also to determine the spatial wave functions of quantum wave-packets. I will present both current experimental status and prospects. Also I will discuss the application of structured beams to atomic clocks and the study of quantum thermodynamics.