Abstract Submitted
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Universal properties in ultracold ion-atom interactions[1] BO GAO, University of Toledo — We present some of the universal properties in ion-atom interaction derived from a newly formulated quantum-defect theory for $-1/r^4$ type of long-range interaction. For bound states, we present the universal spectrum, namely the equivalent of the Rydberg formula, for ion-atom systems. For scattering, we introduce the concept of universal spectrum for scattering resonance positions as a generalization of the universal bound spectrum. Among many conclusions that can be drawn from the universal spectrum, we show that there exists a critical energy, $B_c(l)$, that separates the scattering resonances with positive widths below it, and scattering resonances with negative widths above it. This concept, and many others introduced here including the concept of universal resonance spectrum, are expected to be generally applicable to all quantum systems with long-range interaction of the type of $-1/r^n$ with $n > 2$.

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