Workshop on Cold Rydberg Chemistry



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Dressed Ion-Pair States of an Ultralong-Range Rydberg Molecule

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We predict the existence of a universal class of ultralong-range Rydberg molecular states whose vibrational spectra form trimmed Rydberg series. A dressed ion-pair model captures the physical origin of these exotic molecules, accurately predicts their properties, and reveals features of ultralong-range Rydberg molecules and heavy Rydberg states with a surprisingly small Rydberg constant. The latter is determined by the small effective charge of the dressed anion, which outweighs the contribution of the molecule's large reduced mass. This renders these molecules the only known few-body systems to have a Rydberg constant smaller than $R_{\infty}/2$.

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