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The ultrafine splitting of heavy quarkonium with next-to-next-to-next-to-next-to-leading order accuracy

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Abstract

We compute the hyperfine splitting of P-wave heavy quarkonium states with next-to-next-to-next-to-next-to-leading order accuracy. The resummation of logarithms with next-to-next-to-next-to-next-to-leading logarithmic accuracy is also addressed. A phenomenological analysis of these results is made for bottomonium, charmonium and Bc. We also apply these results to positronium, muonium, hydrogen and muonic hydrogen.

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