Title:	Many-body calculations and hyperfine-interaction effect on dynamic polarizabilities at the low-lying energy levels of Y 2 +
Authors:	Das, A. (/jspui/browse?type=author&value=Das%2C+A.) Bhowmik, A. (/jspui/browse?type=author&value=Bhowmik%2C+A.) Dutta, N.N. (/jspui/browse?type=author&value=Dutta%2C+N.N.) Majumder, S. (/jspui/browse?type=author&value=Majumder%2C+S.)
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Abstract:	The present paper determines the precise values of magic wavelengths corresponding to the clock transitions 52S-42D of the Y2+ ion at the levels of both fine and hyperfine structures due to the external light beams having linear as well as circular polarization. To calculate the dynamic polarizabilities of the associated states of the transitions, we employ the sum-over-states technique, where the dominating and correlation sensitive part of the sum is evaluated using a highly correlated relativistic coupled-cluster theory. The estimated magic wavelengths of the light beams have substantial importance to cool and trap the ion using a blue-detuned trapping scheme. We also present the tune-out wavelengths, which are useful in state-insensitive trapping and cooling. The vector component of a total polarizability, which is induced by a circularly polarized light only, can provide additional magic wavelengths. Considerable effects of hyperfine interaction on the values of polarizabilities and number of magic wavelengths divulge the importance of precise estimations of hyperfine-structure splitting.
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