explained using closed-orbit theory. Atomic units will be used unless specially noted.

II. FORMULAS FOR TOTAL PHOTODETACHMENT CROSS SECTION

The linear triatomic anion interacting with a laser is shown schematically in Fig.1. Symbols 1,0 and 2 represent the three atomic centers in the system. It is convenient to choose the z-axis in the direction of the three-center axis and the middle center denoted by 0 as the origin of coordinates. Let d be the distance between two adjacent centers. The laser polarization direction is denoted as (θ_L, ϕ_L) with respect to the z axis.

In the triatomic anion, one active electron is assumed. This is an extension of the two-center model for photodetachment[34–36] to a three-center model by Afaq *et al.*[38]. In the photodetachment process, there are two steps: in the first step, the active electron absorbs one photon energy E_{ph} and escapes from the negative anion as an electron wave from each center; in the second step, the outgoing waves from each center propagate out to large distances. The interference of the outgoing waves from each center produces oscillatory cross section.

For the general case, as illustrated in Fig. 1, Let Ψ_1^+, Ψ_0^+ and Ψ_2^+ be the detached-waves from center 1, 0 and 2 respectively. Following the previous approach in the two-center case[36], the outgoing detached-electron wave Ψ_M^+ from the triatomic anion can be written as a linear combination given by[36]

$$\Psi_M^+ = \frac{1}{\sqrt{3}}(\Psi_1^+ + \Psi_0^+ + \Psi_2^+). \tag{1}$$

Let (r_1, θ_1, ϕ_1), (r_0, θ_0, ϕ_0) and (r_2, θ_2, ϕ_2) represent the spherical coordinates of the detached-electron relative to the three centers respectively. The detached-electron wave generated from each center has been worked previously[25]. They can be written as

$$\begin{aligned}
\Psi_1^+ &= \frac{4Bk^2 i}{(k_b^2+k^2)^2} f(\theta_1, \phi_1; \theta_L, \phi_L) \frac{\exp(ikr_1)}{kr_1}, \\
\Psi_0^+ &= \frac{4Bk^2 i}{(k_b^2+k^2)^2} f(\theta_0, \phi_0; \theta_L, \phi_L) \frac{\exp(ikr_0)}{kr_0}, \\
\Psi_2^+ &= \frac{4Bk^2 i}{(k_b^2+k^2)^2} f(\theta_2, \phi_2; \theta_L, \phi_L) \frac{\exp(ikr_2)}{kr_2},
\end{aligned} \tag{2}$$

where $k = \sqrt{2E}$ and E is the detached-electron energy; k_b is related to the binding energy E_b of H^- by $E_b = \frac{k_b^2}{2}$. The photon energy is given by $E_{ph} = E + E_b$. B is a normalization