

TABLE II: Comparison of transition wavelengths for  $\text{Li}^-$ ,  $\text{Be}^-$  with literature data. 1 a.u.=27.2113834 eV.  $\hbar c=197.3269602$  eV nm. X-only values are enclosed in parentheses.

Transition	Wavelength (nm)		
	This work	Other theory	Experiment
$\text{Li}^- \ 1s2s2p^2 \ ^5P^e \rightarrow 1s2p^3 \ ^5S^o$	345.96 (321.55)	346.06 <sup>a</sup> , 349.12 <sup>b</sup> , 349.0 <sup>c</sup> , 348.98 <sup>d</sup>	349.07 <sup>e</sup> , 349.0 <sup>f</sup>
$\text{Be}^- \ [\text{He}] \ 2s2p^2 \ ^4P^e \rightarrow [\text{He}] \ 2p^3 \ ^4S^o$	264.14 (252.29)	267.1 <sup>g</sup> , 265.4 <sup>h</sup> , 265.370 <sup>i</sup> , 265.32 <sup>j</sup> , 265.04 <sup>k</sup>	265.301 <sup>l</sup> , 265.318 <sup>m</sup> , 265.331 <sup>n</sup>

<sup>a</sup>Ref. [7]. <sup>b</sup>Ref. [6]. <sup>c</sup>Ref. [33]. <sup>d</sup>Ref. [4]. <sup>e</sup>Ref. [9]. <sup>f</sup>Ref. [10]. <sup>g</sup>Ref. [15].

<sup>h</sup>Ref. [34]. <sup>i</sup>Ref. [20]. <sup>j</sup>Ref. [5]. <sup>k</sup>Ref. [19]. <sup>l</sup>Ref. [12]. <sup>m</sup>Ref. [13]. <sup>n</sup>Ref. [35].

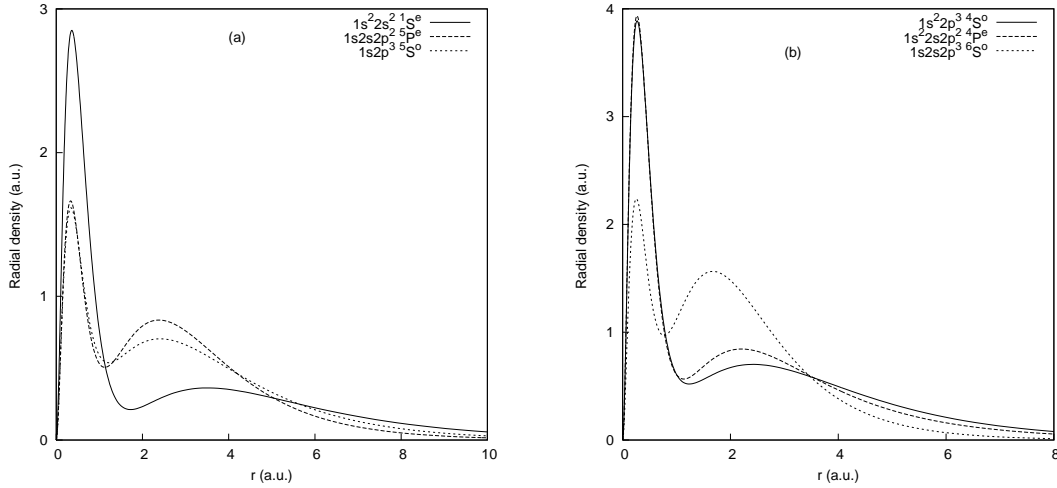


FIG. 1: Radial density plots for several states of (a)  $\text{Li}^-$  and (b)  $\text{Be}^-$ .

large distances, all these three states show similar behavior with the ground state having greater charge density and decaying rather slowly than the two excited states;  $^5P^e$  dying out fastest. Similar radial density plots for all three excited states of  $\text{Be}^-$  are given in Fig. 1(b). In the vicinity of nucleus, the  $^4P^e$ ,  $^4S^o$  states show similar behavior and have much larger charge densities compared to the  $^6S^o$  state, again presumably because the former two have two core 1s electrons while the latter has only one. At the intermediate distance after the first minimum and up to  $r=3.5$  a.u., this situation changes with  $^6S^o$  having the largest charge density. Also the  $^4S^o$ ,  $^4P^e$  states branch out in this region with the latter showing slightly larger peak value than the former. After that at larger distances, all the three states decay in a similar pattern with  $^4S^o$  having higher values and oozing out slowly than the other two and  $^6S^o$  decaying out first. These behaviors in electron density are also reflected