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High Precision Theory and Isotope Shifts for Li and Be+<sup>1</sup> GOR-DON DRAKE, Univ. of Windsor, ZONG-CHAO YAN, Univ. of New Brunswick — In previsous work, we have obtained the most accurate results in the literature for the total energies and isotope shifts for the 2S - 2P and 2S - 3S transitions of lithium, The results provide a powerful new tool for the determination of nuclear charge radii for short-lived isotopes such as the halo nucleus <sup>11</sup>Li [1]. The accuracy of these calculations is currently being increased by the use of larger basis sets in Hylleraas coordinates with multiple distance scales, and the introduction of multiple precision arithmetic. The calculations are also being extended to transitions and isotope shifts in Be+ for purposes of measuring nuclear charge radii in the isotopes of beryllium. As one example, our result for the Bethe logarithm for the 2S state of Be+ for the case of infinite nuclear mass is 2.97923(2) in units of Z-scaled Rydbergs. The present status of isotope shift measurements for light nuclei will be reviewed.

[1] R. Sanchez et al., Phys. Rev. Lett. **73**, in press (2006), and earlier references therein.

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