Feshbach resonances in the ultracold $^6\text{Li}$-$^{173}\text{Yb}$ mixtures$^1$ HUI LI, MING LI, SVETLANA KOTOCHIGOVA, Department of Physics, Temple University — The LiYb molecule is of current experimental interest due to its spin doublet ground state with both electric and magnetic dipole moments. Here, we develop a theoretical model to predict the location and width of Feshbach resonances in $^6\text{Li}$-$^{173}\text{Yb}$ mixtures at ultracold temperatures by taking into account $R$-dependent hyperfine couplings. By using the non-relativistic configuration-interaction valence-bond (CI-VB) method, we, first, compute the hyperfine coupling constants as functions of internuclear separation. The short-range modification of the hyperfine couplings leads to narrow Feshbach resonances. Then we present quantum scattering calculations using the state-of-art ab initio $^2\Sigma^+$ molecular potential, which has been adjusted to reproduce spectroscopic bound-state measurements. The calculated resonance widths, although small, are comparable to some of the successfully observed resonances in RbSr [1]. Finally, we describe the properties of the predicted $^6\text{Li}^{173}\text{Yb}$ Feshbach resonances, offering a guide for current experimental measurements. [1] B. Vincent, C. Alessio, P. Benjamin, R. Lukas, S. Florian, P. S. Żuchowski and J. M. Hutson, Nature Phys. 14, 881 (2018).

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