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Updated photoassociation spectroscopy and mass-scaling of bosonic strontium BENJAMIN RESCHOVSKY, JQI, University of Maryland, BRANDON RUZIC, Sandia National Laboratory, HIRO MIYAKE, NEAL PISENTI, GRETCHEN CAMPBELL, PAUL JULIENNE, JQI, University of Maryland — We present an updated investigation into the mass-scaling behavior of photoassociation resonances relative to the $^3P_1$ state in bosonic strontium. A previous mass-scaling model [Borkowski *et al.*, Phys. Rev. A **90**, 032713 (2014)] was able to incorporate a large number of photoassociation resonances for ^{88}Sr, but at the time only a handful of resonances were known for ^{84}Sr and ^{86}Sr. In this work, we perform a more thorough measurement of ^{84}Sr and ^{86}Sr bound states, identifying multiple new resonances at deeper binding energies out to -5 GHz. We also identify several previously measured resonances that cannot be reproduced and provide alternative binding energies instead. With this improved spectrum, we develop a mass-scaled model that accurately reproduces the observed binding energies of ^{86}Sr and ^{88}Sr to within 1 MHz. In order to accurately reproduce the deeper bound states, our model includes a second 1_u channel to more faithfully reproduce the depth of the potential. In addition, the optical lengths of the ^{84}Sr 0_u^+, $\nu = -2$ to $\nu = -5$ states are measured and compared to numerical estimates to characterize their use as optical Feshbach resonances.

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