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Controlling Feshbach-optimized photoassociation of ultracold atoms with non-resonant laser field[1] HU XUE-JIN, HU ZHONG-KUN, Huazhong University of Science and Technology — We investigate theoretically the formation of ultracold $^{40}K^{87}Rb$ molecules using Feshbach-optimized photoassociation controlled by non-resonant laser field. A scattering resonance can greatly enhance the photoassociation rate via increasing the number of atom pairs at short interatomic separations. Here a non-resonant laser field is employed to induce the coupling between different partial waves and modify the scattering resonance in their position and width. By tuning the intensity of the non-resonant laser field, the photoassociation rate is enhanced by several orders of magnitude with a fixed magnetic field. The employment of a non-resonant laser field gives an additional approach of photoassociation rate control and is much more feasible for the experiment than a dc electric field.

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Hu Xue-Jin
Huazhong University of Science and Technology

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