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Dressed Two-Body Bound States in Bose-Fermi Mixture Near Broad Interspecies Feshbach Resonances MOHAMMAD S. MASHAYEKHI, University of British Columbia, JUN LIANG SONG, University of Innsbruck, FEI ZHOU, University of British Columbia — Since the observations of molecules of Fermi atoms near Feshbach resonances, fascinating pairing correlations in cold Fermi gases have been successfully investigated both experimentally and theoretically. Interspecies Feshbach resonances in Fermi-Bose mixtures of 6Li - 23Na , 40K - 87Rb and 6Li - 87Rb have been experimentally observed. Previous theoretical studies on Fermi-Bose mixtures have been mainly focused on narrow resonances or when the atom-molecule coupling is very weak; phase boundaries in this limit depend on atom-molecule coupling strengths. Experimentally, creating and probing correlations in Fermi-Bose mixtures near narrow resonances are more challenging than near broad resonances. So some of well studied resonances are quite broad. We have studied the evolution of dressed two-body bound states near broad interspecies Feshbach resonances which can be potentially probed in experiments. We further discuss the effect of Fermi surface dynamics due to fluctuating particle-hole pairs known as GMB (Gorkov-Melik-Barkhudarov) corrections.

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