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Feshbach resonances and photoassociation in heteronuclear systems¹ MARKO GACESA, PHILIPPE PELLEGRINI, ROBIN CÔTÉ, University of Connecticut — Feshbach resonances have been observed in recent experiments [1] with two different atomic species involving Bose-Fermi mixtures. Such experiments allow the study of new phenomena such as boson-mediated Cooper pairing, the formation of heteronuclear molecules, or degenerate gases with long range dipole-dipole interactions. We studied the scattering properties of mixed alkali gases in the presence of a magnetic field, focusing our attention on systems that include Li, such as Li-Na, Li-Cs or Li-Rb. Several Feshbach resonances were found for experimentally accessible magnetic fields. We also analyzed the production of ultracold ground state molecules via photoassociation in the vicinity of those Feshbach resonances, and found a substantial enhancement of molecule formation in deeply bound levels. For this work, new accurate *ab initio* potentials have been used. [1] S. Inouye et al. Phys. Rev. Lett. **93**, 183201 (2004). C.A. Stan et al. Phys. Rev. Lett. **93**, 143001 (2004)

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