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Absorption measurements of alkali-metal resonance lines broadened by He and molecular hydrogen collisions F. SHINDO, J. BABB, K. KIRBY, Harvard-Smithsonian CfA — The optical and near-infrared spectroscopic observations of cool brown dwarfs exhibit very prominent signatures of sodium and potassium resonance lines. The atmospheres of these objects are mainly composed of molecular hydrogen and helium and the collisions of these species with the alkali-metal atoms induce broadening of the K and Na resonance lines by as much as 100 nm either side of the line core. Particularly important are the far line wings, where satellite features which are usually very temperature-sensitive may appear due to extrema in the difference potentials. These features are highly sensitive to pressure and temperature, whereas their position and shape depend critically on the details in the interaction potentials. Accurate line profiles can serve as valuable diagnostics of the physical characteristics of brown dwarfs and extrasolar giant planets. Experimental determinations of the far wings are indispensable in validating the theoretical models. We report here our measurements of the absorption coefficients for pressure broadening in the far wings of the 4s-4p and 4s-5p doublet lines of potassium atoms in the presence of helium and hydrogen gas at temperatures around 900 K. Supported in part by NASA grant NNG06GF06G.

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