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The ALFALFA-SDSS Galaxy Catalog

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We present an HI-optical catalog of $\sim 30,000$ galaxies based on the 100% complete Arecibo Legacy Fast Arecibo L-band Feed Array (ALFALFA) survey combined with data from the Sloan Digital Sky Survey (SDSS). Our goal is to facilitate public use of the completed ALFALFA catalog by providing carefully determined matches to SDSS counterparts, including matches for $\sim 10,000$ galaxies that do not have SDSS spectra. These identifications can provide a basis for further cross-matching with other surveys using SDSS photometric IDs as a reference point. We derive absolute magnitudes and stellar masses for each galaxy using optical colors combined with an internal reddening correction designed for small- and intermediate-mass galaxies with active star formation. We also provide measures of stellar masses and star formation rates based on infrared and/or ultraviolet photometry for galaxies that are detected by the Wide-field Infrared Survey Explorer (WISE) and/or the Galaxy Evolution Explorer (GALEX). Finally, we compare the galaxy population in the ALFALFA-SDSS sample with the populations in several other publicly-available galaxy catalogs, and confirm that ALFALFA galaxies typically have lower masses and bluer colors.