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# Automated morphological decomposition of galaxies in large imaging surveys

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Many studies of the properties and evolution of galaxies need reliable structural parameters of their components. There is no "universal solution" to this problem yet due to the diversity of the galaxy population along with the evolving quality of images (in terms of depth, resolution, wavelength coverage and data volume). We present our efforts to decompose ~13000 galaxies from the Galaxy and Mass Assembly (GAMA) survey in 9 optical and near-infrared images (each) into their bulges and disks. The model fitting uses a fully automated MCMC analysis with the 2-dimensional Bayesian profile fitting code ProFit (Robotham et al. 2017). The preparatory work includes image segmentation/source identification, background subtraction and point-spread-function estimation and is also carried out in an automated fashion using the sister package ProFound (Robotham et al. 2018; an astronomical image analysis package rooted in medical imaging software). After fitting the galaxies, we perform outlier rejection, model selection and quality control in various semi-automated steps, including a detailed study of systematic uncertainties. We find that our fit results are robust across a variety of galaxy types and image qualities with minimal biases, while MCMC uncertainties typically underestimate the true errors by factors 2-3.

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