



MACHINE LEARNING FOR ASTROPHYSICS

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Measuring the intracluster light fraction using machine learning

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The intracluster light (ICL) is an important tracer of a galaxy cluster's history and past interactions. Up to now, only small samples of ICL have been studied due to its very low surface brightness, the difficulties in comparing measurement methods, and the high level of manual involvement needed for most measurements. To process the amount of data expected from upcoming imaging surveys like Euclid and the Vera C. Rubin Observatory's Legacy Survey of Space and Time (LSST), we need fully automated and fast methods to make these measurements. In this talk, I will present our work developing a machine learning model that can predict the ICL fraction in cluster images from the Hyper Suprime-Cam Subaru Strategic Program. I will show that this model has been able to effectively learn this task even with very few real data samples, using transfer learning from ICL fractions in artificially generated images. I will describe the methods we use that could be useful for similar machine learning applications in astronomy, and discuss the potential applications of this model with particular focus on upcoming large surveys like LSST.

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Session Classification: Past and future multiwavelength all-sky surveys