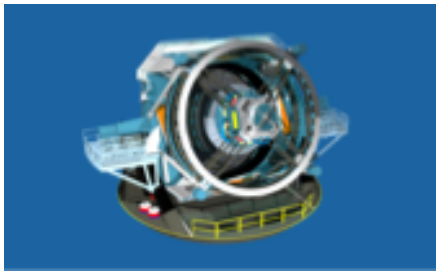

ID de Contribution: **25** Type: **Non spécifié**

Improved Point Source Detection in Crowded Fields using Probabilistic Cataloging

mardi 13 juin 2017 11:50 (25 minutes)

Cataloging is challenging in crowded fields because sources are extremely covariant with their neighbors and blending makes even the number of sources ambiguous. We present the first optical probabilistic catalog, cataloging a crowded (~0.1 sources per pixel brighter than 22nd magnitude in F606W) Sloan Digital Sky Survey r band image from M2. Probabilistic cataloging returns an ensemble of catalogs inferred from the image and thus can capture source-source covariance and deblending ambiguities. By comparing to a traditional catalog of the same image and a Hubble Space Telescope catalog of the same region, we show that our catalog ensemble better recovers sources from the image. It goes more than a magnitude deeper than the traditional catalog while having a lower false discovery rate brighter than 20th magnitude. We also present an algorithm for reducing this catalog ensemble to a condensed catalog that is similar to a traditional catalog, except it explicitly marginalizes over source-source covariances and nuisance parameters. We show that this condensed catalog has a similar completeness and false discovery rate to the catalog ensemble. Future telescopes will be more sensitive, and thus more of their images will be crowded. Probabilistic cataloging performs better than existing software in crowded fields and so should be considered when creating photometric pipelines in the Large Synoptic Survey Telescope era.

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Classification de Session: Workshop