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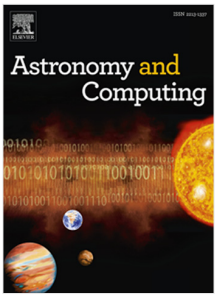

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PySE: Software for Extracting Sources from Radio Images

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Abstract

PySE is a Python software package for finding and measuring sources in radio telescope images. The software was designed to detect sources in the LOFAR telescope images, but can be used with images from other radio telescopes as well. We introduce the LOFAR Telescope, the context within which PySE was developed, the design of PySE, and describe how it is used. Detailed experiments on the validation and testing of PySE are then presented, along with results of performance testing. We discuss some of the current issues with the algorithms implemented in PySE and their interaction with LOFAR images, concluding with the current status of PySE and its future development.

Keywords: astronomical transients, techniques: image processing, methods: data analysis

1. Introduction

The LOFAR Radio Telescope (van Haarlem et al., 2013) is a radio interferometer comprised of many antennae situated throughout Europe, and linked by a high-speed network. It is one of the new generation radio telescopes, along with the Australian Square Kilometer Array Pathfinder (ASKAP; Johnston et al., 2008), the Murchison Widefield Array (MWA; Tingay et al., 2013), and the Long Wavelength Array (LWA; Ellingson et al., 2009). These telescopes provide high-resolution wide-field imaging,

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