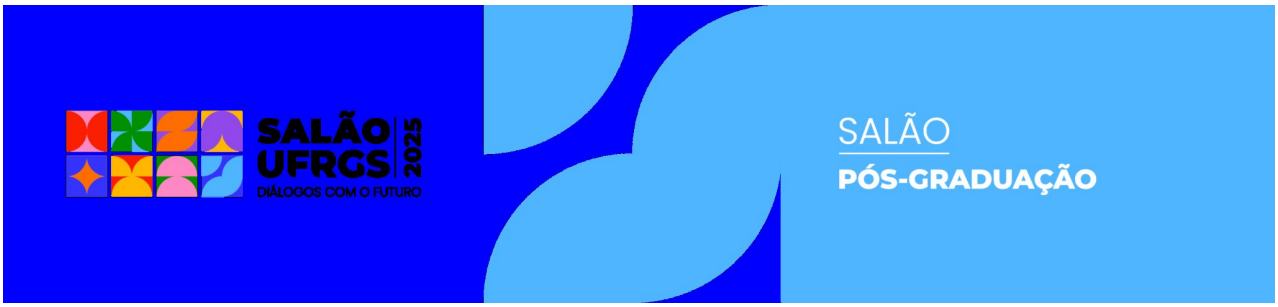


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Extragalactic Globular Cluster Near-Infrared Spectroscopy: Full Spectral Fitting of Centaurus A (NGC 5128)

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Abstract

To address ongoing contrasts in near-infrared (NIR) stellar population synthesis (SPS) models, this work presents a high-fidelity analysis of integrated spectra (0.95–2.45 μm) for 31 globular clusters (GCs) in Centaurus A, acquired with SOAR/TripleSpec. Employing full spectral fitting to derive stellar population parameters, we establish a robust framework for assessing the fidelity of current NIR modeling techniques. This homogeneous dataset provides the empirical base for a systematic inter-comparison of prominent SSP models, including the latest versions of MILES, Maraston, DSPS, BC03, and XSL, facilitating a critical evaluation that reveals model-dependent biases and outlines the conditions under which their predictions differ. Furthermore, this analysis provides the foundational benchmark for developing our proposed spectral analysis pipeline, BRAIN, for which we introduce a novel statistical methodology to enhance fitting fidelity while reducing computational demand. This research refines extant NIR methodologies and confronts the canonical age-metallicity degeneracy, underscoring the imperative for developing computationally efficient pipelines like BRAIN to huge data anticipated from premier observatories such as JWST and the Rubin Observatory.

Keywords: stellar populations; globular clusters; spectroscopy